

The Iron Age

INDEX TO
READING MATTER
PAGE 40.

A Review of the Hardware, Iron and Metal Trades.

INDEX TO
ADVERTISEMENTS
PAGE 27.

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The Whitworth Steel Press.

Prof. T. Egleston, of Columbia College, describes in a recent issue of the "School of Mines Quarterly" the observations made during a visit last year to the works of Whitworth, at Manchester, England.

Their methods, he says, of obtaining very large ingots free from blow-holes and of forging them are undoubtedly those which must be used in the near future for the treatment of steel in large masses. The experiments which have produced these results were commenced in 1863, and have been continued with great success, but with enormous expense, ever since, securing for the inventor the honor of knighthood in addition to a world-wide reputation, not only for the size and quality, but also for the great accuracy of his work at the same time. The steel is made in the Siemens-Martin furnace, and is poured in at the top of steel ingot molds, which are cylindrical in shape and cast especially for the purpose. They are built up of sections, which are securely bolted together by means of flanges, the size and number of the sections depending on the length and weight of the piece to be cast. These molds are fitted with rods on the inside in such a manner as to facilitate the packing of molding sand in the strongest way. The melted steel is let into the ingot mold standing on a truck in front of the furnace. The truck runs on rails placed in the bottom of a trench which is parallel to the furnaces, and is carried at once to the press. The head of the press is brought down on to the liquid steel and allowed to rest on it without any pressure, except its own weight, being put on it, and is locked in that position. The first effect is a shower of sparks, which, as the mold is closed by the projection on the head, last only a few seconds. The pressure is then very gradually applied from below. It has been found necessary to commence with the pressure as soon as the mold is closed and the head of the press locked, as the gases are all the more easily driven out of the steel as it is more fluid. The maximum pressure is usually arrived at in about half an hour, the time depending on the weight of the casting. This maximum is generally about 13,000 pounds to the square inch. The pressure varies with the amount of ductility required of the metal, the greatest being when the greatest and the least when the least is required. When the process was being experimented on pressures as high as 20 tons to the square inch were used, but experience has shown that beyond the pressure of about 6 tons no sensible advantage is gained, and this is now generally adopted for the limits of the heaviest ingots which have as yet been made. During the time of pressure, gas in large quantities escapes from every aperture in the mold, which at once takes fire and burns on the outside. The volume of the steel diminishes in the course of the first five minutes as much as one-sixth to one-eighth of the length of the ingot. Experience has shown that there is no gain in compressing it more than this, but that the maximum pressure must be gradually applied, and that there is no advantage of extending the time even for very large castings much over 35 minutes. After the maximum pressure has been applied it is gradually let down to 1500 pounds per square inch and kept at this pressure until there is no longer any danger of further contraction of the metal, which, if allowed to act as it would without pressure, might crack in the interior, and thus endanger the strength of the ingot.

The ingots are always cast hollow, and all the forging is done upon mandrels of large size. They are brought under the hammer head, which is pressed down a certain depth from its middle toward one end. At each successive plunge of the head the steel yields like dough and moves forward toward the end, exactly in the same way. As the movement is slow and without shocks, all the particles move in the same direction,

When the movement has been made from the middle toward one end, the pieces are made to move in the other direction. It is generally found that it is best to increase the length of the ingot no more than 6 feet at a single operation. The ingot then goes back to the furnace, is reheated, and this operation is continued until the requisite form is arrived at. All the forging being done in this way on a mandrel and in a die, the pieces are forged with remarkable accuracy.

The press which serves for shaping is made to accommodate itself to any size or form of piece. By turning the piece round in the die, perfectly uniform results can be obtained, so far as the shape of the steel is concerned, while the continued action of the pressure

probably is the reason of the high quality of all the steel made by this process.

The method of doing the work, and of making all the pieces hollow, has a decided advantage. It is well known that the center of all large pieces is an element of weakness, adding nothing to the strength of the piece, but greatly increasing its weight. It is exceedingly doubtful whether by hammering a large ingot can ever be made perfectly sound at the core. Many of the serious accidents which result from the fracture of large forgings have been caused by the propagation of these central defects to the outside, when rupture takes place. The center of any very large forging is always an element of uncertainty.

great hammers in use near St. Petersburg, at Essen and at Creusot seem to have reached their limit both of size and usefulness. The cost of the foundations increases so rapidly with the capacity of the hammer, and the danger to other structures of striking such heavy and quick blows as are necessary to make such forgings, seem to put them out of the question, independently of the effect of the blow on the quality of the steel. A 2000-ton press, which is entirely independent as a machine and produces no shocks, and requires, therefore, no expensive foundations, is equal in efficiency to an 80-ton hammer, and can do as much work as, and do it very much more accurately than, any hammer. It is doubt-

The Trenton Engines.

We present herewith engravings illustrating different classes of a new automatic cut-off engine built by the Phoenix Iron Company, of Trenton, N. J. It is known as the Trenton engine, and in its proportions and forms differs somewhat from those of the well-known types of engines already on the market. It was intended to build an engine containing the least possible number of parts and the simplest elements of mechanical movements attainable, and how well the builders have succeeded will be best seen by examining our illustrations.

Three different classes of engines are built Figs. 1 and 2 representing front and rear elevations of an engine of Class

A. This engine is designed for variable heavy work and has balanced valves worked by a trip gear. The cylinder and its base are cast in one piece, the steam-chest being a separate casting. The bed, cast together with the guides and main pillow-block, is bolted to the cylinder through flanges. The base under the main bearing is extremely large, so as to distribute the concentrated forces and the weight of the fly-wheel over a large surface of foundation. The crank and cross-head pins, as well as the piston-rod, are steel; phosphor-bronze is used throughout for all bearings. The crank disk is weighted to balance the weight of the crank-pin and half of the connecting-rod. All wearing parts are adjustable. The governor (a parabolic Watt's) having crossed arms, is almost isochronous. The eccentric-rod has a loose hook, so that it may be thrown out of gear, permitting the engine to be run by hand or to reverse. The valves, two in number, are circular in cross-section, and are fully shown in Figs. 3, 4 and 5. Fig. 5 is a longitudinal section through the steam-chest, showing the side of the cylinder, the valves, vertical valve stems, longitudinal valve stem, rocker-arm for rotating the valves, and the dash-pots. The position of the valves in Fig. 5 shows the admission port open in the left-hand valve, and the exhaust port open at the right-hand. The left-hand valve is just on the point of cutting off, Fig. 3 is a transverse section through the cylinder and steam-chest, showing the trip arrangement, dash-pots, stop-valve and exhaust-chamber. Fig. 4 is a horizontal section through the steam-chest and half of the cylinder, showing a section through the valves at the middle throw and the steam passages to the cylinder; also the two exhaust outlets at the ends of the steam-chest. An inspection of these illustrations will show that the valves are hollow cylinders, through which the main valve stem passes, and upon which they rotate. The valves, which are independent of each other as to circular motion, are rotated alternately by the reciprocating motion of the eccentric, through the eccentric-rod, rocker-arm and the two vertical valve stems which pass through the steam-chest. The lower ends of these stems are connected to pistons working in dash-pots, and the upper ends to the releasing or trip gear. At about the middle of these stems are fastened yokes carrying phosphor-bronze boxes, through which the crank stems pass, and which are fastened to and rotate the valves through the vertical motion of the stems. The vertical motion of the stems is imparted by means of the above-mentioned rocker-arm, the horizontal arms of which carry phosphor-bronze boxes, which slide in yokes moving up and down in cast iron guides. These guides, to which the vertical valve stems are attached, are supplied with triggers, against which at each upward motion the yokes in the guides press, thus causing the motion of the rocker-arm to be transmitted to the vertical stems. When the triggers come in contact with the levers, which are adjusted to different positions by the sliding plates or wedges, which again are dependent for their position upon the speed of the governor, they are thrown out

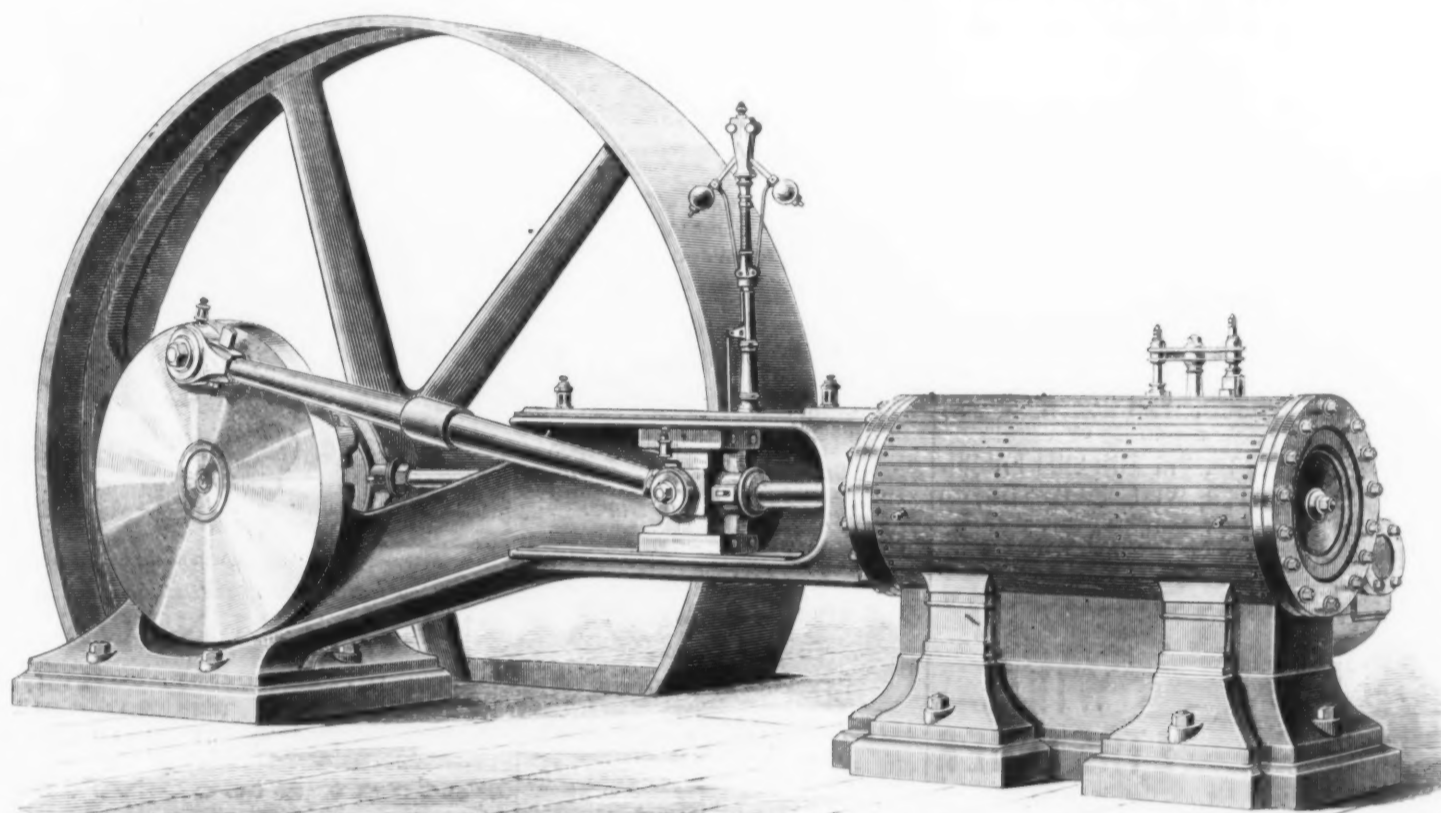


Fig. 1.—Front View of Class A Engine.

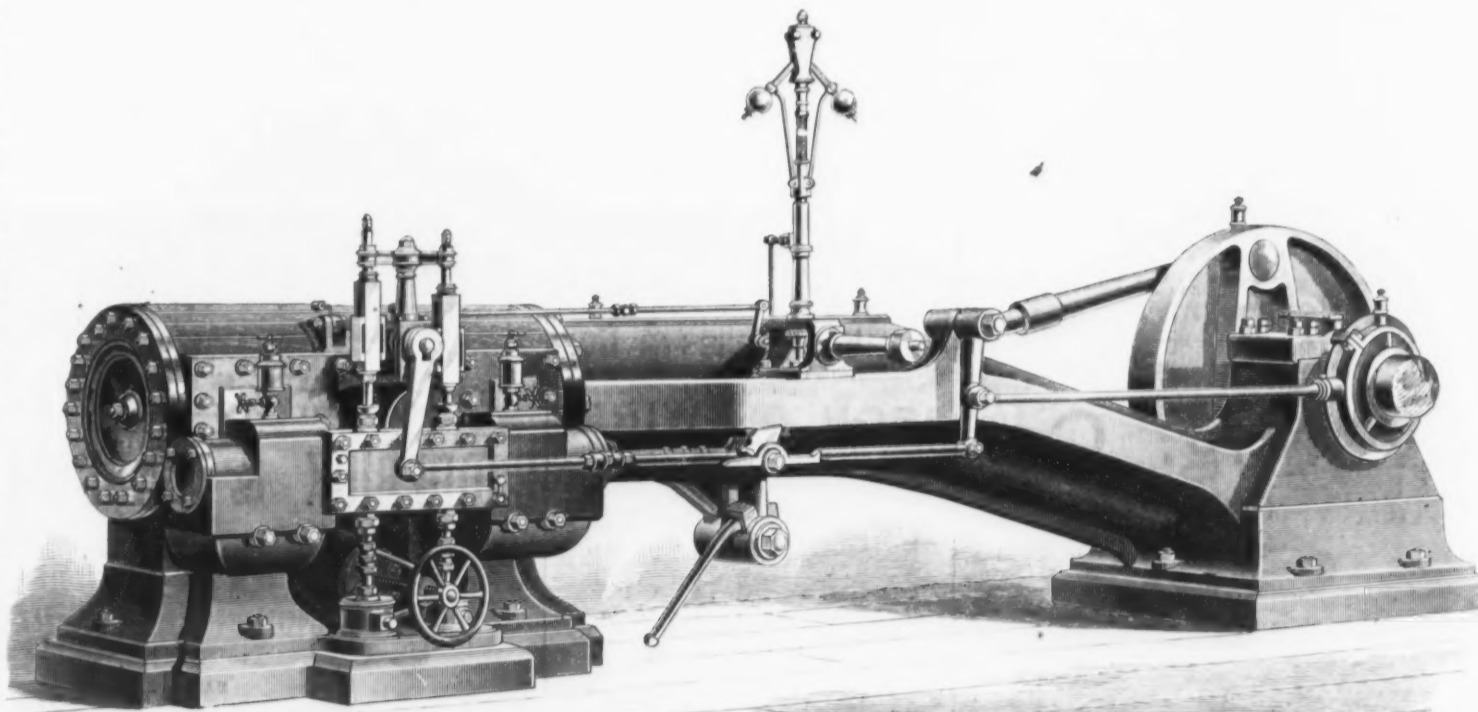


Fig. 2.—Rear View of Class A Engine.

THE TRENTON AUTOMATIC CUT-OFF ENGINES, BUILT BY THE PHOENIX IRON COMPANY, TRENTON, NEW JERSEY.

forces the steel to assume the shape which the quick, sharp blow of the hammer could not produce both on account of the exceedingly short time of action and the elasticity of the piece. The slow penetrating action of the press draws out the crystals and makes them assume the direction of the flow. All shocks, and consequently all tendency for the crystals to assume large faces, are avoided. The small crystals are simply forced to follow the direction which the pressure gives, and to flow continuously without changing their form or their size, their general arrangement only being changed, so that, instead of becoming larger or more separated, they tend to become smaller and more closely compacted, which

By removing it altogether, and forging on a mandrel, the pieces can be made one-third, or even more, lighter and stronger, thus diminishing the quantity of material while increasing its efficiency. Sir Joseph Whitworth claims that, in addition to these advantages, the ductility of the steel is easily brought up 30 per cent. All these effects become the more apparent according as the casting is heavier. The method seems to be the only one for treating very heavy castings. The various Government commissioners who have examined the method have reported in favor of it, and some of the largest works in Europe are now about to adopt it, as the work done by the press could not be done by the hammer at all. The

ful whether it would ever be worth while under any conditions to build a hammer that would be equal in efficiency to the 8000 and 10,000 ton presses which are doing the current work of Whitworth's establishment. If we are to have castings capable of turning out 100-ton guns, we must have some other means of treating the steel than the sharp, quick blow of the hammer, which is quite as likely to tear and crack the steel in certain stages, and to produce unnecessary internal strains in all, as to benefit the metal. The press seems to solve the problem.

The Dominion Minister of Finance must raise \$55,000,000 to meet obligations of the Government Treasury due July 1.

(Continued on page 17.)

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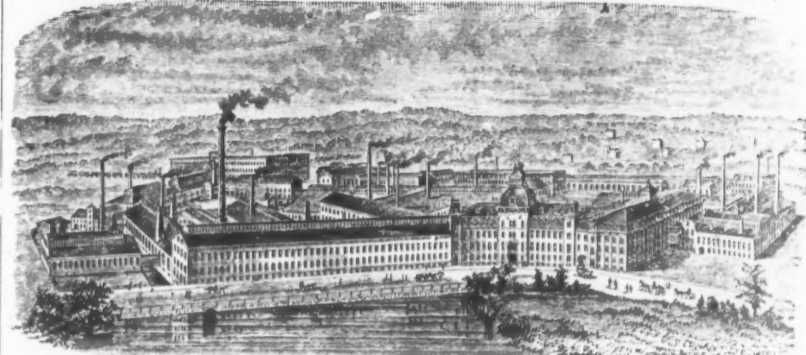
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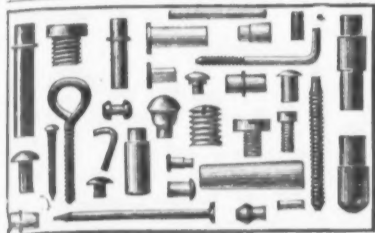
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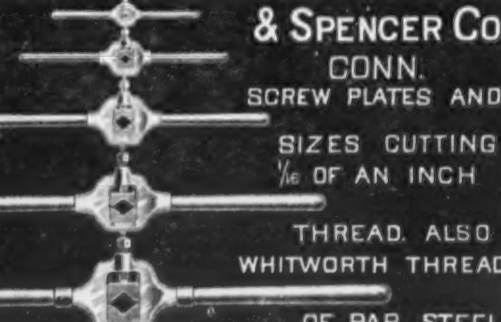


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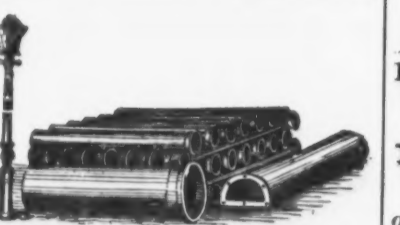


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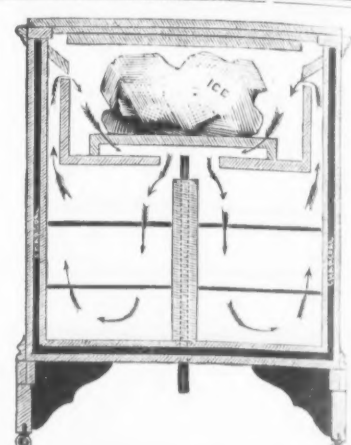
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TRADE PUBLICATIONS.

Iron Specialties.

We have received from the Van Dorn Iron Works, Cleveland, Ohio, a collection of their catalogues showing the different specialties which they manufacture. One is devoted to wrought-iron fences and contains a large number of designs that cannot fail to be of value to all who have occasion to use such material. Another relates to castings and terminals. This, while presenting many stock designs, also shows a considerable amount of new work. Over some of the new designs we notice a legend which cannot fail to meet approval in the mind of every reputable manufacturer. It is in the following words: "Honest competitors will not copy our designs, but will leave that to pirates." Another pamphlet is devoted to stable fittings and contains a varied assortment of goods in this line. Still another one contains designs of lawn vases, of which a large assortment is presented. Another is devoted to jail-work and shows various features of design and construction that are of interest to all who have to do with penal institutions, the designing of jails, &c. Still another book is devoted to area, stair and balcony railings, fire escapes, vault doors, &c., and is as complete in its features as the others already enumerated.

Foot-Power Machinery.

The W. F. & John Barnes Company, of Rockford, Ill., have sent us a copy of their new price list and descriptive catalogue of foot-power machinery. The pamphlet contains nearly 100 pages and presents numerous illustrations of the foot-power specialties manufactured by this company, as well as a large line of hand tools more or less useful in the wood-working trades. The first subject treated in the pamphlet is foot-power machinery for practical use in workshops. A description is presented of a complete outfit of foot-power machinery of this kind, which operates with a positive motion always in the right direction, with large economy of power and without dead centers. An illustrated description of the foot-power combination is presented, after which some of the special machines to which it is applied are shown. Among the illustrations are cuts of scroll-saws of different sizes and capacities, after which is shown a foot-power former, which is supplemented by illustrations of the knives with which it is fitted. The work that can be done upon this machine embraces sash rails and various small moldings, including flutes. Three pages are devoted to sectional views in perspective, showing the forms produced by the knives used upon this machine. The assortment is varied, and shows conclusively the utility of the device. The next machine presented is a combined scroll-saw and circular saw, following which is shown a boring attachment to be used upon this machine. Cutter-heads are also illustrated, for use upon a saw mandrel for a combined machine for cutting grooves, gains, dados, &c. A hand circular rip-saw is likewise shown, made in different sizes and of different capacities. An improved foot-power molding machine and hand tenoning machine, several foot-power lathes and foot-power grinding and polishing machines complete the assortment of tools of the general class we have been describing. The remainder of the book is devoted to drills, miter-saws, parts of machines and numerous hand tools, in which a very interesting assortment of staples and specialties is shown. The catalogue is of great usefulness to all in the trade who have occasion to purchase or use any of the kinds of tools above mentioned. We understand that it is to be sent free to all applicants.

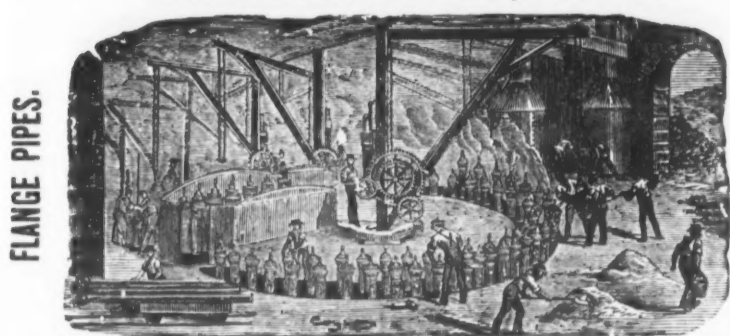
Fire Department Supplies.

The Silsby Mfg. Co., Seneca Falls, N. Y., have issued a very handsome and unique catalogue executed by Gies & Co., of Buffalo, who have lately given much attention to catalogue publication, having in one department 100 hands who attend to nothing but catalogue and pamphlet work. Before describing this catalogue as a matter of trade interest, we wish to speak of it as a matter of art interest. In its line it is unique, lithography, photography, wood engraving and printing having contributed to its beauty and excellence. The covers are lithographed. The full-page illustrations are artotypes, the illustrations accompanying the text are woodcuts, and the letter-press is printed from types. The combination is judiciously managed, and, although the catalogue is not so large or costly as many we have seen, it is probably the most attractive and interesting ever published in this line of trade. The growing demand for artistic catalogues has called a great deal of talent into the service of manufacturers to whom catalogues have been a business necessity, and we are glad to learn that Messrs. Gies & Co. have made this a regular department of their extensive and well-managed business. In this catalogue the Silsby Mfg. Co. illustrate and describe a large and interesting line of specialties. The first 40 pages of the pamphlet refer to the different styles and sizes of their steam fire engines, hose carriages and hose carts. In connection with the artotype illustrations of the fire engines, giving a general view of the machines, a mechanical as well as general description is printed, the construction of the boiler and some of the smaller parts being shown by woodcuts. In the next division of the pamphlet are noticed various styles and sizes of rotary hand pumps, rotary power pumps and rotary fire pumps; Holly's rotary stationary steam fire engine and a rotary wrecking pump are also illustrated and described. The catalogue closes with a long line of fixtures, parts and supplies required in the equipment of a fire department. While the Silsby Mfg. Co. invite intending purchasers to visit their works, and offer every facility for the inspection of their machines in the different stages of manufacture, the purchaser will probably be able to gather all the information he desires from an inspection of their catalogue.

A shipment of 800 bales of new Partido tobacco, bought in Cuba on German account, at 34 to 40 cents per quintal, was received in New York by the Havana steamer.

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BURLINGTON, N. J.



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OPEN HEARTH METAL.

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For Taps, Dies, Chisels, Drills, Shear Knives, &c. Warranted equal in quality and uniformity to any English Steel. Sole agents for the
HARTMAN STEEL CO.
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Sole Agents for W. S. SIZER'S STEAM FORCE.



We can furnish Forgings of any size, either Iron or Steel, plain, forged or rough, turned any diameter up to 30 inch, 35 feet long.

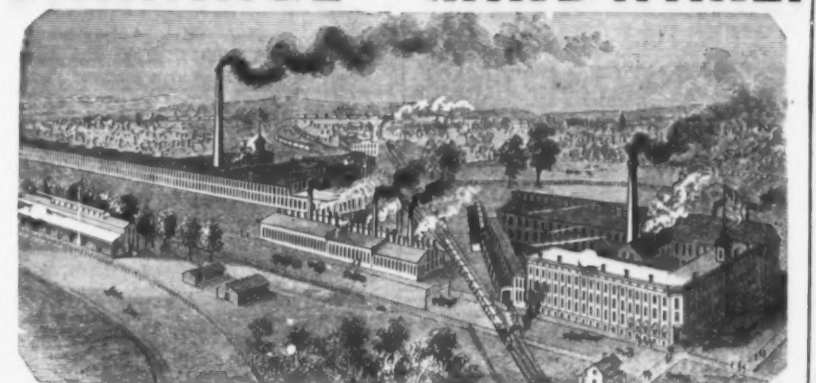
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Cotton Presses, Forgings,
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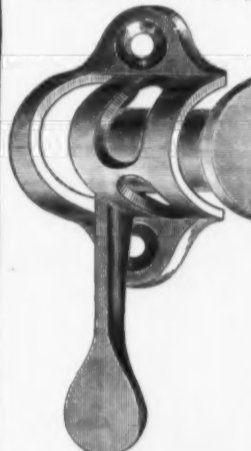
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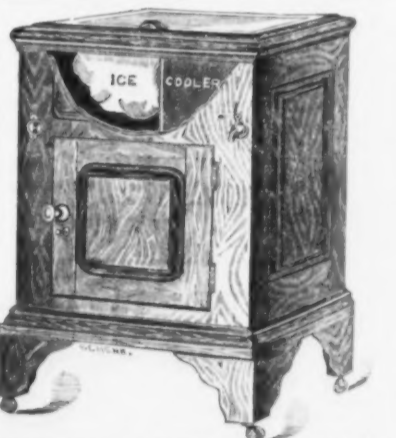
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Is the best, cheapest and most complete Sash Holder and Lock in the market, and we think has the largest sale. It holds the window at any point, and locks the sash when down, and entirely prevents wind from rattling. I am the sole owner of this patent, and so manufacturer of these fasteners, and all persons are hereby notified of this fact. Any parties infringing will be dealt with according to law. Parties who have been buying and selling the "Practical Fastener," so-called, will do well to heed the warning. Orders from the trade respectfully solicited.

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Latest, Cheapest
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Household, Orchard
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THREE DIFFERENT
SIZES
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The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

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It is made of brass, is strong and light, and is the best pump of its kind in the market. Write for prices.

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MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to order. Special attention given to Tinning, Bronzing, Coppering, Japanning and Fitting. A large line of Carriage and Wagon Castings constantly on hand for the trade.

BALL BEARING DOOR MANGERS
For House Doors, Car Doors, Elevator Doors.
Frictionless. Indestructible. Perfect. Send for Circular.
COHOES IRON FOUNDRY & MACHINE CO., COHOES, N. Y.

Experience in the Use of Thick Steel Boiler Plates.

BY MR. W. PARKER.*

An ordinary cylindrical boiler of 13 feet diameter and 16 feet long, designed for a pressure of 150 pounds per square inch, for which the scantlings were amply sufficient, burst under the hydraulic test. The pressure was applied very carefully, and when it had reached 240 pounds the fracture occurred, extending completely across one of the shell plates, and to a slight extent also into the adjoining plate. The boiler was constructed entirely of steel, made by the Siemens-Martin process by a firm who enjoy the reputation of producing a material second to none in the country. The plates were all tested at the steel works, and fulfilled the requirements of both Lloyd's Register and the Board of Trade. I find from our surveyor's report that the sample from the particular plate which failed, which was 1 1/4 inches thick, stood a tensile strain of 29.6 tons per square inch, with an elongation of 20 per cent. in a length of 8 inches, while strips cut from it were bent almost double cold. In fact, the material appeared, from the mechanical tests applied before it left the steel works, to be in every respect suitable for the purpose for which it was intended. One remark, however, may here be made, namely, that the plate in question was exceptionally large and heavy, viz., 20 feet long, 5 feet 6 inches wide, and 1 1/4 inches thick, weighing about 2 tons 16 cwt. This material was built up into a boiler by a company who have had an unusually extensive experience in the manipulation of steel, having turned out no fewer than 175 boilers of this material. The plates were treated precisely as other steel plates have been treated in the same works, and with all the appliances which experience has shown to be necessary; all the holes were drilled, and the plate was then heated in a furnace and bent to the required curvature in a pair of powerful vertical rolls in the usual manner. Under these circumstances it appeared at first sight astounding to find the material tearing under a pressure which represents a strain of 6.7 tons per square inch only, or less than one-fourth of the strain which the original sample withstood. In addition to this the appearance of the fracture indicates that the plate did not possess any ductility, stretch or elongation whatever. Neither the steel-makers nor the boiler-maker have as yet afforded any satisfactory explanation of the occurrence. It is without doubt a most serious affair, especially in view of the high pressures which have now become so common.

On hearing of this accident the committee of Lloyd's Register instructed me to investigate the matter, endeavor to ascertain the cause of the accident, and, if possible, recommend some measure to prevent such an occurrence in the future. Upon my visit to the boiler-making works I was fortunate enough to find a sister boiler to the one which had burst, ready for testing. This boiler was tested in my presence to 300 pounds per square inch, and was carefully measured and gauged and found to show no signs of deflection or yielding. I also ascertained from an examination of the testing appliances that an abnormal pressure could not possibly have been exerted at the time of the testing of the first boiler. Seeing that the plates that broke had stood all the mechanical tests required before leaving the steel works, and that when worked into the form of a boiler shell it gave way at less than one-fourth of its original strength, it appeared at first sight that the plates had been in some way injured, or had undergone some material change from the time they left the steel works until they were riveted into the form of a boiler shell, therefore it became necessary to look carefully into the mode of manipulation of the plates in the boiler shop, and especially the heating and bending of them. One of the plates was bent in my presence. It was heated in an ordinary plate furnace, but when taken out was far from being of a uniform heat. The end of the plate near the door of the furnace was at a black heat, which gradually increased toward the other end to a dark red heat. Then the plate was turned end for end and again placed in the furnace with a view to heating it as far as possible uniformly, but when again drawn out of the furnace it was seen that the heat was not at all uniform, one end being of a dark red or nearly black heat, which gradually cooled down to a blue heat at the other end. In this condition it was passed through a set of powerful vertical rolls and bent to the required curvature. The plate passed through these rolls six times, and by the time the operation was completed one end of the plate was quite cold, while the other end remained at a blue heat. It was thought that this unequal heating of the plate may have set up in the body of the plate excessive strains of a dangerous character, and that these strains were aggravated by rolling the plate at a dangerous heat, it being well known that the ductility of all steel becomes lessened when worked at a blue heat, and it is, I think, generally admitted that it is far safer to work steel cold or red-hot than at any heat between these two points. Steel plates, and especially large ones, must be injured by such treatment; but as to the intensity of the strains set up or their exact locality nothing definite can be said. To ascertain the nature of the material as it stood, test pieces were cut from the fractured piece, both close to the fracture and apart from it, and subjected to tensile test at one of Lloyd's proving houses, with the following results, which the engineers have kindly communicated to me:

ranges from 21.8 per cent. to 28.1 per cent. in a length of 8 inches. I may say that I corroborated these tests by others made from the same plate for my own information in London, and they were also corroborated by other tests made for the information of the steel-makers. This range of about 4 tons in the tensile strength of a plate of homogeneous metal like mild steel is very unsatisfactory. I obtained samples of the plate, and submitted them to five eminent and independent metallurgists, who have kindly furnished me with the results of their chemical analyses, which are as follows:

Car.	Sil.	Sul.	Phosph.	Mang.
36	.015	.055	.087	1.05
37	.016	.044	.076	.641
34	.01	.038	.065	.612
3	.018	.044	.063	.648
26	.005	.038	.007	.65

The most striking feature in these analyses is the large proportion of carbon shown to exist in the plate. It is particularly high for boiler plates. Material used for thin plates—say, from 1/2 inch to 3/8 inch thick—to stand the same mechanical tests as these thick plates did, would not contain more than from .15 to .18 of carbon; and these facts led us to further experiments. In view of the great difference in the amount of carbon required in steel for a thick plate and a thin one to stand the same mechanical tests, it was deemed desirable to make an experiment which would determine to what extent work in the shape of rolling, and especially rolling thin plates, which, during the latter part of the operation must of necessity be rolled, comparatively speaking, cold, affected the tenacity and ductility of the material. A slab of steel containing about the same amount of carbon as the plate which ruptured, viz., .33, was obtained at the steel works where the plate was made, and rolled at one heat down to 1/2 inch in thickness. This material, had it been rolled down to 1 1/4-inch plate, judging from the carbon it contained and the tests of the broken plate, as well as the opinion of the steel makers, would have had a tenacity of from 30 to 34 tons per square inch. It was found, however, that when rolled down to 1 1/2 inch thick its tenacity was increased to from 35 to 41 tons per square inch, with an elongation of from 21 to 24 per cent. in a length of 8 inches. Other pieces were made hot and quenched in water. These, when tested, broke at a tenacity of from 44 to 45 tons, and had, practically speaking, no stretch at all. Pieces were cut from the fractured edge of the plate and subjected to tensile, bending and temper tests. They showed a tenacity of 33.5 to 34.2 tons per square inch, but they stretched only 13 and 16 per cent., and broke with a crystalline fracture. They bent cold to a considerable degree, but when made red-hot and quenched with water, instead of bending as pieces of a thin plate of similar tenacity and ductility would do, they broke under the first blow of a hammer without any bending whatever. The material was so high in carbon as to take a temper and become quite hard and brittle. Further cold-bending tests were made from pieces of the broken plate, both before and after being annealed; those which were tested before annealing bent fairly well, strips 1/2 inch square bent to an angle of 49 to 61°, the fracture showing a considerable amount of alteration in form, while those pieces which were tested after annealing bent much better—in fact, almost double. Strips, however, that were heated and quenched in water broke short without any bend whatever at the first blow of a hammer, and thus corroborated the previous experiments made in London. These experiments point to the fact that the plate which gave way must have become partially tempered by the heating and cooling to which it was subjected for the purpose of rolling it into its cylindrical form. The heating not having been uniform, the tempering could not have been uniform, and the variations in the temper no doubt have caused the variations in the strength and ductility shown by the different parts of the plate. The hardest part of the plate, yielding less than the rest, became naturally more strained, and hence the plate tore at its hardest part at a pressure only a small fraction of that which it would have borne if its yielding had been uniform.

I think it will be acknowledged that a material which is so high in carbon as to take a temper and break short as described, even if it possesses high qualities of tenacity and ductility before being tempered, must be looked upon as unreliable and altogether unsuitable for use in marine boilers. It would appear that the desire to obtain high steam pressures, and to use steel of a higher tenacity consistent with a large amount of ductility, has caused the marine engineering world to unknowingly drift into using a material of an unreliable and unsuitable character for the shells of marine boilers, more especially when the usage which such plates receive in heating and bending is considered, for, except among steel makers, it does not appear to have been generally known that the thicker a plate is the more brittle and erratic in its behavior it must become, as compared with a thin plate made to stand the same mechanical tests as far as tenacity and ductility are concerned, as, otherwise, I feel convinced that the increase in tenacity from 29 to 32 tons for thick boiler shells would not have been advocated. So far as I am concerned, and the society which I represent, I may say that it has always been our endeavor to discourage the use of steel of high strength. The rules of Lloyd's Register require boiler plates to have a tensile strength of from 26 to 30 tons, and have done this from the commencement of the use of steel, because we felt that the higher the tenacity arrived at the more

Samples.	Breadth.	Thick-ness.	Area.	Total tons.	Square inch. Tons.	Extension in 8 in. per cent.	Extension in inches.	Contracted area.
S. I. X.....	1	1 13-50	1.26	40.5	32.14	27.54	2 3 16	11 16 7 1/2 & 1 32
S. C. H. L.....	1	1 13-50	1.26	41.75	33.1	26.59	2 3 16	29 32 23 32
S. 2.....	1	1 13-50	1.26	41.5	32.33	21.27	1 11 16	1 13 16 13 16
S. C. H. 2 X.....	1	1 13-50	1.26	39.5	31.35	23.4	1 1 16	1 3 16 1 3 16
S. XX.....	1	1 13-50	1.26	37.5	29.7	21.8	1 1 16	1 3 16 1 3 16
S. IXX.....	1	1 13-50	1.26	37.5	29.56	20.6	2 3 16	31 32 25 32
S. XXX.....	1	1 13-50	1.26	38.5	30.5	28.1	2 3 16	11 16 & 1 32 15 16
S. L. XXX.....	1	1 13-50	1.26	38.25	30.3	27.54	2 3 16	29 32 7 1/2

From these tests it appears that the proved tenacity of the plate ranges from 29.5 tons to 33.1 tons, while the elongation

* Institution of Naval Architects.

Paris, 1878.

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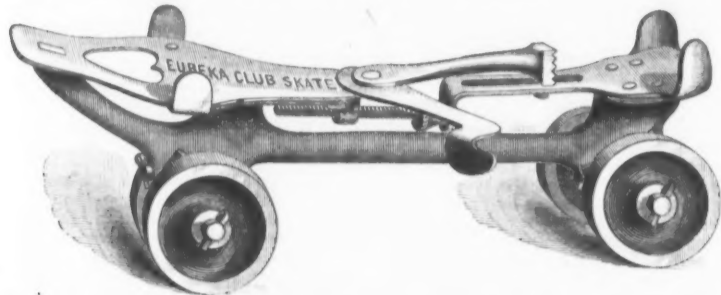
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Flat Wood,
Gang Edger,
Ginsaw,
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Half-Round,
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Hand,
Hand Equaling,
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Handsaw Taper, slim,
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Knife Blunt,
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Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
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Square Blunt,
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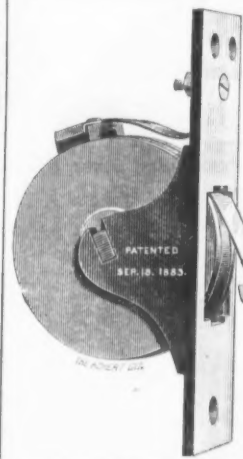
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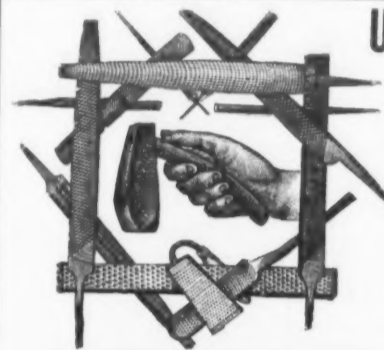
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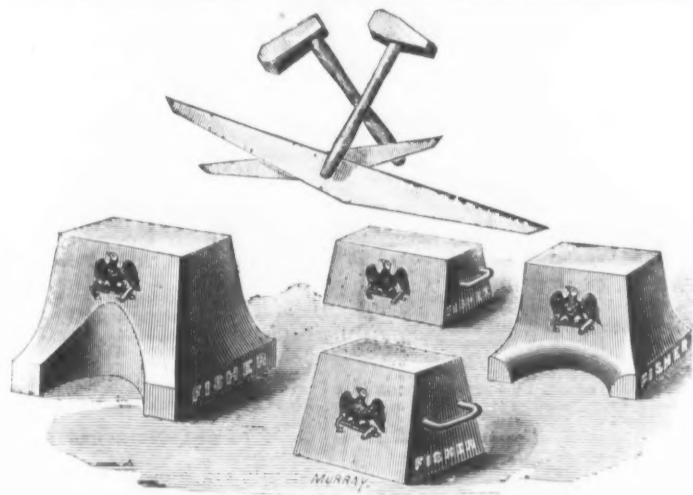
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strength of 32 tons per square inch for thick
 boiler-shell plates. This accident and the
 investigations which have followed clearly
 point out that engineers have been drifting
 toward the use of an unreliable material, or
 at all events a material which is too near the
 verge of danger to be pleasant—a state of
 things that should not exist with steam
 boilers. I would therefore urge, in order to
 remedy this growing evil, that the tenacity
 of steel plates for boiler shells—which are
 becoming thicker every day—should in no
 case exceed 30 tons, and that a temper test
 should be insisted on from every thick plate,
 and the practice of using enormously large
 plates should be discouraged, while more care
 should be exercised in uniformly heating
 and bending these plates. I have conferred
 with the principal steel-makers in the king-
 dom on this subject, and am able to say that
 they agree with me and are decidedly of
 opinion that steel plates over 1 inch in thick-
 ness and having a tenacity of more than 30
 tons must contain so much carbon as to
 render them unsuitable for boiler-making
 purposes, although they may possess the
 necessary tenacity and ductility to with-
 stand the usual tensile and cold-bending
 tests. I venture to hope that this paper will
 be made the subject of a discussion, with a
 view to obtaining further opinions respecting
 the important points in question.

Mr. Thomas Turner, of the Corngreaves
 Iron and Steel Works, near Birmingham,
 writing to the Engineer on the subject of
 Mr. Parker's paper, says:

Undoubtedly mild steel is the best material
 available for boilers, but it is well known
 that, to be used to advantage, it must be
 thoroughly understood and properly treated,
 or otherwise it may be made much inferior
 to iron as regards strength and safety. I do
 not wish for a moment to imply that the
 boiler-makers in the instance Mr. Parker
 describes had not a thorough knowledge of
 the best methods of working mild steel; but
 I am inclined to think, with Mr. Parker,
 that it is not generally known how much
 harder a thick steel plate is than a thin one
 to stand the same tensile tests, and there-
 fore it is not probable that the boiler-makers
 in this case had no knowledge of the special
 hardness of this plate, and that they worked
 it in their usual way without special care as
 to its uniform heating and cooling. It will,
 I suppose, be said that steel for boilers should
 not require such special care, or, rather, that
 they should not be such as will be easily
 damaged by any ordinary treatment. So
 long, however, as the Board of Trade,
 Lloyd's, &c., insist upon having such high
 tensile strengths the makers of such large
 plates must have an excess of carbon in the
 steel in order that they may come up to the
 requirements, chiefly because they do not
 usually get the same relative amount of
 working upon them that a thin plate does.

Seeing, then, that it is the required high
 tensile strength that necessitates the plates
 being made harder than usual, does it not ap-
 pear that the remedy lies in reducing this
 required tensile strength, say, for such plates
 as exceed a certain thickness? Mr. Parker
 urges that the tensile strength should not
 exceed 30 tons per square inch; but is not
 this too high for thick plates? The experi-
 ence with the plate in question appears to
 indicate that it is, as its recorded strength
 at the steel works was 29.6 tons per square
 inch. To prevent such occurrences
 one or more temper tests should be taken
 from every plate, and if the steel must be
 mild, and the 28 to 30 tons per square inch
 is to be insisted upon, the only way out of
 the difficulty seems to be for the plate-
 makers to have machinery capable of work-
 ing from thicker ingots and dealing with
 them equally as effectively as with the
 smaller ones for thin plates, thus giving
 them the same relative amount of working.
 It will be of interest to some to know how
 much influence extra work in the rolling
 mill has upon the tensile strength of steel,
 and, as I happen to have some results by
 me of an experiment made at these works, I
 give them here.

An 8½-inch ingot was taken and rolled
 down to 3 inches diameter only; a piece of
 the 3 inches was rolled to 2 inches, the 2
 inches to 1 inch, and the 1 inch to ½ inch,
 with the following results:

Tensile Tests Made from Bars Rolled from the
 Same Ingot.

No. of test piece.	Mark of steel.	How manufac- tured.	Diam of bar, inches.	Breaking stress, square inches.	Elongation in a length of 8 in., per cent.
728	N. B. I. C.	By open-hearth process	3	32.08	16.4
729	"	"	2	23.4	30.4
730	"	"	1	24.4	32.4
731	"	"	½	26.5	36.5

Of course no maker of steel bars would
 think of making a 3-inch bar out of an ingot
 so small as 8½ inches. It was rolled that size
 in this case for the purpose of illustration.
 In some other tests which we made and
 rolled down to as low as ¾ inch, the ten-
 sile strength rose from 22 to 32 tons per
 square inch, or nearly 50 per cent. increase
 due to the increased working.

This clearly shows, then, the effect of
 working, and shows by what means the ten-
 sile strength may be kept up. In the present
 state of things, however, I can only ad-
 vocate that engineers, wherever possible,
 should be content with steel having a less
 tensile strength, and thus secure a trust-
 worthy, soft, and easily workable material
 which imperfect treatment will not easily
 damage; and whenever higher strengths
 of steel are to be used, they should be
 worked with care by experienced men, and
 annealing should, in such cases, be always
 carried out after local heating or such
 treatment as bending. It would be difficult
 and expensive to properly anneal all such
 large steel plates after being bent, but that
 is therefore the more reason for using a
 milder steel. Mr. Denny, in the discussion,
 advocated the use of "the strongest steel
 that can be got." What engineers ought to
 use, however, is not "the strongest steel
 that can be got," but the steel that will make
 the strongest boiler.

Mr. W. Cuthill, representing Messrs. Col-
 ville & Sons, the makers of the plate, has
 contributed the following to the discussion:

"I am engineer to and represent the
 manufacturers of this unfortunate plate. In
 reference to the author's paragraph at the
 close of his paper regarding the steel-maker's
 views coinciding with his as to the desira-
 bility of ceasing to make and use this high
 strength of steel for boiler shells, my firm
 agreed with him on that point, in considera-
 tion of the evident difficulty boiler-makers
 have in manipulating such steel in sizes so
 large and thick. They believe, however,
 that the cause of this failure is not so mys-
 terious as it looks, and that the boiler-maker's
 difficulties may be overcome, and they wish
 their agreement with the views they have
 expressed qualified.

"I saw the plate immediately after its
 failure, and certainly in appearance a more
 mysterious fracture could not well present
 itself—not complete to one edge of the plate,
 and only through to the other by a fine hair
 line, it gaped and bulged out of line at the
 center in the most ugly manner. Its manipu-
 lation in the boiler yard was freely and
 obligingly described.

"As to the history of its manufacture, the
 steel was made in the most approved manner
 from the purest materials by the Siemens
 process. It was cast into a 4-ton ingot measur-
 ing 30 inches by 21 inches at bottom, and
 19½ inches thick at top. It was next re-
 heated and reduced under a 12-ton steam
 hammer to a slab about 10 inches thick,
 weighing about 7000 pounds. It was again
 reheated and rolled to thickness; the plate
 when shorn measured 20 feet 7 inches by
 66½ inches by 14 inches, weighing about 2½
 tons. Its final stage was a careful heating
 equally all over in an improved plate fur-
 nace, after which it was allowed to cool in
 the open air. The test-pieces were shorn
 from the scrap of the plate, and underwent
 the same process of heating as the plate. The
 tensile and bending tests of this particular
 plate were made in the presence of both the
 Board of Trade and Lloyd's surveyors, the
 test stamp upon the plate being 29.6 tons and
 20 per cent. extension in 10 inches.

"Some of the tests of the plate since made
 corroborate the original, while others are
 considerably higher, averaging about 2 tons
 over it. No explanation can be given as to
 this, other than that the original was taken
 from the scrap edges, while the higher ones
 and better in extension have been taken
 from the plate. No circumstance in the
 manufacture can account for this variation,
 which in any case cannot explain the cause
 of failure.

"The reliable analyses give the elements
 of a good quality of steel for this thickness
 and strength of plate. The carbon is some-
 what high, and is proof of the otherwise
 pure quality of the material. Considering
 the behavior of the steel under mechanical
 tests, it must be evident to any steel-maker
 that several of the analyses given are quite
 unreliable. Taking the last on the list as
 correct, it is not to be wondered at that the
 steel tempers to brittleness when cooled from
 red heat in water at winter temperature.
 Under no circumstances could shell plates be
 subjected to such treatment. Several of the
 test-pieces supplied to my firm were an-
 nealed before testing, and showed no temper-
 ing had occurred in the boiler-maker's hands.
 "After carefully considering the whole
 matter, I maintain nothing will explain it
 that can be found in the composition, manu-
 facture, tests, tempering quality and general
 condition of the plate as it left the manufac-
 turer's hands.

"My theory as to the fracture of this
 plate is just the one, in my view, that ex-
 plains all fractures occurring in steel plates
 of good quality, whether they be of low or
 high tensile strength, low or high in carbon.
 When a plain steel plate is locally heated
 and simply allowed to cool again no harm
 will result; no plate was ever known to
 crack from this treatment; but while under
 this heat, if work be put upon it so as to
 change its form or disturb its molecular ar-
 rangement in part or whole, then internal
 strains are set up, which, according to their
 severity, may or may not produce cracks.
 When this internal change due to the work
 put upon the plate is completed its condition,
 so far as the local heat is concerned, seems
 to become normal, the work having acted as a
 lock upon unequal contraction; all the con-
 tractions that otherwise would then take
 place from that unequally heated condition
 throw up strains between parts. Coming to
 the plate in question, it was heated previous
 to being rolled to the shell curve, in the
 usual type of boiler-maker's furnace, with
 a large end grate and two smaller side ones.
 Judging from the manner these furnaces
 act upon plates generally, the plate would
 be heated unequally. When rolled to a cir-
 cle the whole material would be disturbed in
 its molecular condition, that condition be-
 coming normal with the variety of heat upon
 it, and severe strains are certain to have been
 set up internally. As evidence of this sev-
 eral plates had been observed to curve cross-
 wise in cooling, appearing on end thus

So severe had these strains been
 in this particular plate and that particular
 part of it that they only required the assist-
 ance of some 7 tons of test pressure to over-
 come the strength of the plate. Some idea
 of the amount of strain caused in this way
 might be obtained by comparing the exten-
 sion of steel per ton per square inch up to
 the limit of elasticity with the contraction of
 steel per degree per difference of heat, thus:
 By Kirkcaldy's tests on mild steel this ex-
 tension is .000082 of its length per ton of
 tension put upon it. It is stated in Box's
 treatise on heat that iron expands or contracts
 .00006689 of its length per degree of
 difference of heat. I find that steel is in
 excess of iron by about 8 per cent., say
 .00007; it therefore appears that every 12°
 difference of heat causes as much contraction
 as 1 ton of tension per square inch will
 extend steel.

"Again, referring to Box's treatise, a
 table of temperatures will be found cor-
 responding to the different colors of heat,
 thus:

Red, just visible.	Deg. Fahr.	Difference.
Red, dull.	977	318 + 12 = 330 tons.
Red cherry, dull.	1350	180 + 12 = 192 tons.
Red cherry, full.	1470	41 tons.

"Dividing the difference of temperature
 by 12 we have the corresponding strains in
 tons per square inch. Added to this the na-

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NOW, This, is to Witness, that, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,
FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and
SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1885.

WITNESSES—
E. M. REED,
(Attorney for Defendant.)

G. A. ROBINSON. (L.S.)
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Kansas City, Mo.
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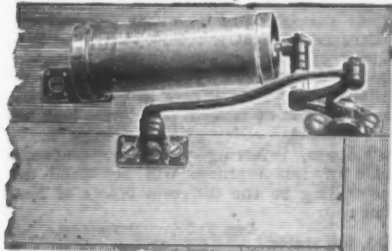


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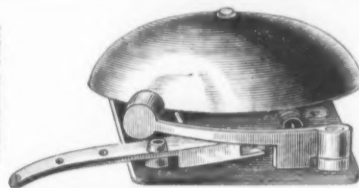
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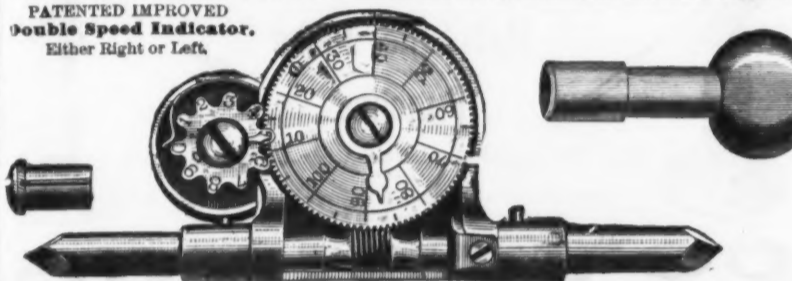
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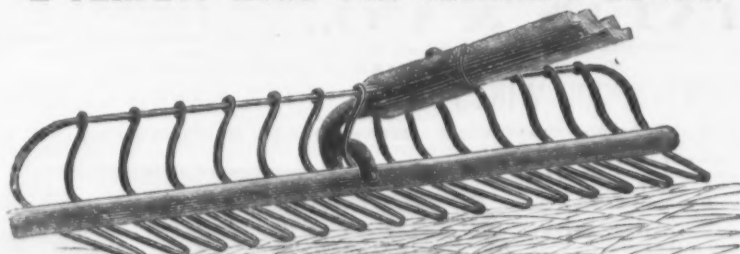


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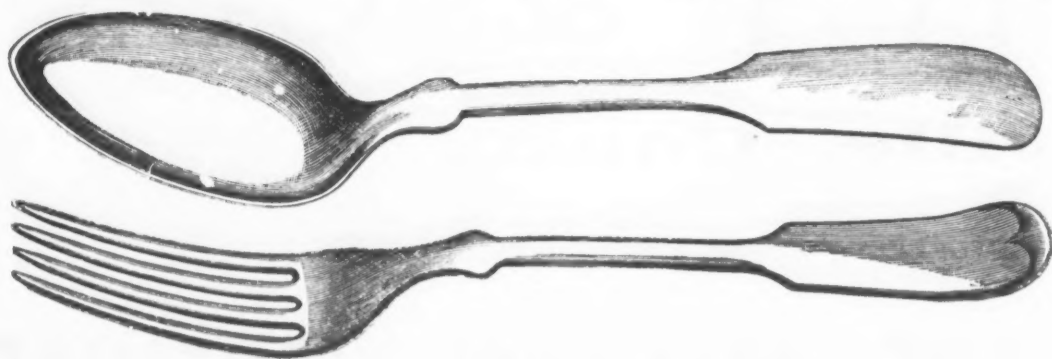
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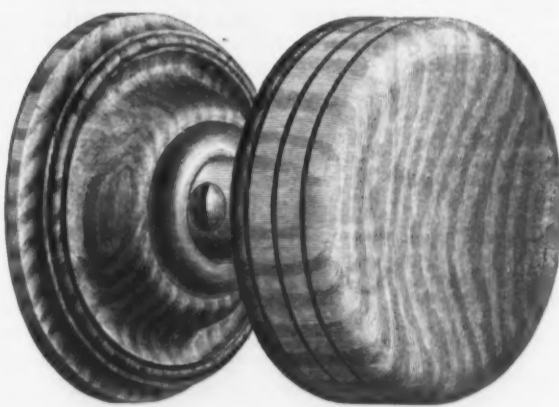


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ture of steel should be considered, its homogeneous and finely crystalline structure, and its evident preference to cracking instead of stretching when under this internally bound-up condition.

"I greatly regret that Lloyd's Registry and the Board of Trade are objecting to the class of steel in question. In my opinion steel as made by the best reputed makers up to 33 or 34 tons strength is in every respect perfectly as reliable for boiler sheets and bridges where no local heating takes place, as steel of 26 to 30 tons is for internal parts of boilers. But we must improve our means of heating large plates."

English Letter.

(From Our Regular Correspondent.)

LONDON, April 20, 1885.

THE WEEK

has brought no improvement in the industrial or general commercial outlook, although at the moment there is a vague sort of impression that we may not have war after all. After the "hot wave" in favor of immediate hostilities with Russia a cooler and calmer phase of what is styled public opinion has supervened, and just now there are indications that the Afghan trouble will be allowed to blow over.

In the meantime, amid all the uncertainties of the moment, every branch of industry is dull with the exception of those where Government orders are in hand. Men cannot move so long as they are confronted with a war of great magnitude, besides which actualities in the shape of advanced freights and insurances to the Baltic, Black Sea and for the Mediterranean ports have to be taken seriously into account. The Government have already taken up an immense amount of tonnage, and have so much more at call that even mail steamers like the Orient liner Austral have been kept back from sailing for three or four days on the chance of an immediate declaration of war. The only advantage so far seems to have accrued to the farmers in the shape of a rise of some 6/8 in the price of wheat, with a proportionate advance in flour. The country corn markets have been greatly excited, and the agriculturists have not been highly displeased in witnessing the first fruits of another Russian war. At the same time there are good reasons for assuming that not many farmers have wheat to sell, the bulk of them having been compelled to realize at the very low prices which have ruled since September last. The hope that the rural districts will benefit by the advance in wheat, therefore, does not appear likely to be realized. Even were the anticipation quite fulfilled, I do not think the home market as a whole would be benefited, seeing that any augmentation in the values of breadstuffs must needs fall upon the whole of our people, and so greatly diminish their purchasing powers; for, as cheap food is a prime desideratum, we might purchase even that at too high a price.

THE IRON MARKET.

remains very quiet indeed, and cannot be expected to undergo any improvement so long as the political outlook is characterized by the uncertainty which has distinguished it for some weeks past. At Glasgow warrants have been rather irregular, but generally weak, and there has been only a limited number of transactions, the closing price being 41/10 p. ton. In Scotch makers' brands the changes of the week have been unimportant, and quotations may be called nominally the same as before. The reserve stocks, it may be noted, are now equal to those of a year ago, and are still increasing notwithstanding the present output. Shipments are relatively light, and have decreased largely this year to date, whereas a greatly increased tonnage of Middlesboro' pig iron has been brought into the East Coast ports of Scotland. At Middlesboro' there is no life whatever in the market, the current demand being but slight and the outlook anything but good. The "bears" are still having matters pretty much their own way, and all the circumstances of the time being seem to play into their hands. For No. 3 the nominal rate is about 34/4, but from second hands even lower prices are said to be offered. On the West Coast hematite pig iron is steady at about 44/ for mixed lots in usual proportions, and there is a fairly good consumption, besides an outlook in several branches of the steel trade which the smelters consider justifies them in exercising caution in entering into engagements as to futures. In the other principal pig-iron producing districts matters are very quiet, and the contracts concluded since quarter-day have not been sufficiently comprehensive to clear off the whole of the make. Values are nominal, therefore, and buyers have the best of the situation, albeit the producers seem to think that, with a great war in immediate prospect, they ought not to commit themselves far forward. In galvanized iron and fencing wire the turnover is moderate, while selling prices are on no settled basis. Heavy manufactured iron is in moderate request, the only activity noticeable being at the concerns engaged on Government and railway work. Ordinary finished iron is irregular and generally unaltered at the values enumerated last week. There is no pressure anywhere, and many of the mills and forges are poorly engaged. The demand, such as it is, runs mainly on common and medium sorts of bars, plates, sheets, &c. For old materials the market here is fairly steady. F. Pitts & Co., London, quote: Old double-headed iron rails, £2. 12/6 @ £2. 15/; No. 1 heavy wrought scrap, £2. 2/6 @ £2. 5/; old boiler tubes, £2. 5/; old cast iron, £2 @ £2. 2/6, and old leaf-spring steel, £2. 7/6, all f.o.b. London or other good British port. Freights are as of late, with the exceptions of the Baltic and Black Sea ports, to which rates and insurance have been advanced. Pig iron by ordinary steamers from Glasgow to New York is steady at about 2/ @ 2/6 p. ton. A meeting of the shippers, &c., engaged in the Australasian trade has been held during the week to consider the freights hence to those colonies, but their deliberations were conducted in private. Steel is quiet as regards

the general Sheffield branches, but there is a good business doing in large forgings and special castings. The Bessemer works are mostly tolerably well employed on sleepers and rolled materials. It is reported that a good portion of the Indian order for sleepers, alluded to last week, has gone or is going either to a German or Belgian concern. The Siemens concerns are busy on ship plates, tin plates and general mild-steel products. Prices are again 2/6 p. ton higher. Steel rails are without alteration on the basis of £4. 15/ p. ton for usual heavy sections. Foreign orders are scarce, but deliveries are being made to Egypt, and there is a good deal of work in hand—India and Canada.

SCOTCH PIG IRON

is very quiet and has scarcely varied 2d. p. ton on warrants since the date of my last report. Nothing more definite has been heard of the restriction rumor, and for the present I do not think it is worthy of attention. There are 90 furnaces in blast in Scotland, against 92 a year ago. In Connal's stores there are 593,908 tons (an increase of 859 tons last week), as against 593,339 tons this date 1884. Shipments of pig iron to date are 30,477 tons behind those of 1884, while the importations into Scotland of Middlesboro' pig iron are 33,982 tons ahead. Current prices are about as under:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow.....	51/	46/6
Coltness, ".....	51/	50/
Langloan, ".....	53/	50/
Summerlee, ".....	51/	46/
Calder, ".....	51/6	46/3
Carnbroe, ".....	48/	46/
Clyde, ".....	46/9	42/9
Monkland, ".....	42/3	40/3
Quarter, ".....	41/9	39/9
Govan, at Broomielaw.....	42/3	40/6
Shotts, at Leith.....	51/	50/6
Carron, at Grangemouth.....	52/6	47/
Kilmichael, at Bo'ness.....	44/	43/
Glenharroch, at Ardrossan.....	48/	42/6
Eglington, ".....	43/	39/6
Dalmellington, ".....	46/6	42/6

MIDDLESBORO' PIG IRON

is excessively dull, the outlook being considered especially bad for a class of iron which is principally shipped to Baltic and North Sea ports. Current rates are as follows for Q. M. B., f.o.b. at makers' wharves in the Tees, less 2 1/2 on roth of following month:

No. 1 Foundry.....	37/	Mottled	32/6
" 2 ".....	35/6	White	32/3
" 3 ".....	34/	Refined Metal.....	50/
" 4 ".....	33/6	Kentledge.....	36/
" 4 Forge.....	33/	Under.....	31/

WEST COAST HEMATITES

are fairly steady under the influence of good orders from the Bessemer concerns, but, like all other commodities, it is devoid of "body." Prices:

	No. 1.	No. 2.	No. 3.
Cleator.....	45/6	45/3	45/
Lonsdale.....	44/6	44/	43/6
Lowther.....	44/6	44/	43/6
Workington.....	44/6	44/	43/6
Distington.....	44/3	43/9	43/8
Harrington.....	44/9	44/3	44/
Solway.....	44/	43/6	43/
Maryport.....	44/6	44/	43/6

TIN PLATES.

In London this market is decidedly weaker than it was at the time of my last report. There has not been, relatively speaking, much business done during the week, and buyers are still holding off, while some of the makers are pressing for orders, they not having earlier in the year taken the precaution, like some of their competitors, of looking well forward. I quote ordinary IC cokes 13/3 @ 13/6, f.o.b. Liverpool. At Liverpool at present most forward business is in abeyance. The little business doing is for quick delivery. Some low offers have been made of less than 13/6 for good coke tins and 13/6 for Bessemer steels, but there is not much doing at these figures. For the orders placed in good coke tins 13/6 @ 13/9 IC is paid, and occasionally a trifle less for steels. Many makers, however, are pretty full of orders at present, while others are not so fortunately situated. The demand for coke-tin wasters in ordinary sizes is fairly well kept up at 12/9 @ 13/ p. box—that is, for good and well-known brands. In the other department of steel plates, viz., that of best or Siemens steel with coke finish, as well as those with a charcoal finish, there is less doing, though perhaps there are more orders for the former than for the latter. The price of these are still 14/6 IC, while charcoals are without any material change. The well-sorted specifications of charcoals range from 15/6 to 16/6 IC, and best charcoals up to 17/6 IC. The demand for heavy coated charcoals and best charcoals is certainly lessening. Though it cannot be very well said that the number of orders coming forward for ternes is as large as one would expect at the spring season of the year, there is a decided increase in the number of inquiries, and some disposition shown to place orders. Several orders were placed at the close of last week. The ternes maintain their ground better as regards prices than tin plates, as they are not worked much to stock, but chiefly in accordance with actual orders to hand. The figures still vary from 13/ to 14/ IC. The shipments for last month total up well, viz.: 620,000 boxes, as compared with 500,000 boxes in the corresponding month last year and 440,000 boxes in the corresponding one of 1883, which is really an increase of 180,000 boxes per month in two years; yet stocks go on increasing on this side, which is a clear proof of the overproduction still going on, and explains the low prices that are ruling. There are some good inquiries to hand, several being from the Continental markets, and a disposition is shown to buy if low prices will be accepted.

The Boiler-makers' and Shipbuilders' Society.

The annual report of the United Society of Boiler-makers and Iron Shipbuilders of England has just been issued. The secretary says the past year, the fiftieth in the society's existence, will long be remembered as one of the most disastrous in the annals of shipbuilding. Never since this important industry sprang into existence has a collapse so sudden, so widespread and so injurious in its consequences been witnessed. In 1884 the sum paid to members out of employment alone amounted to £57,205. At the beginning of the year there were 3928 members out of employment, and at the end 9046. The average was 6681, or 23 1/2 per cent. of the society. The balance in

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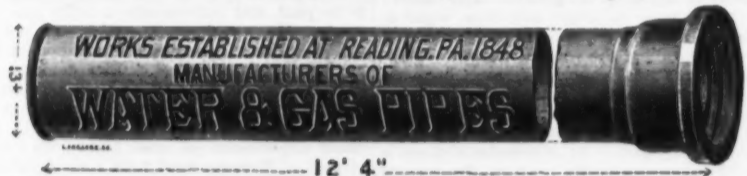
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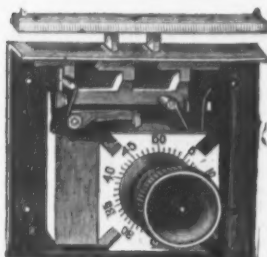
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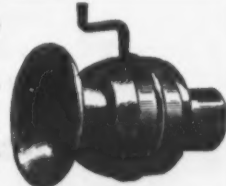
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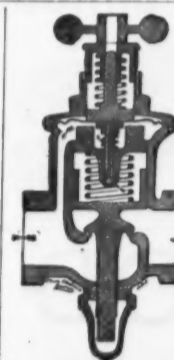
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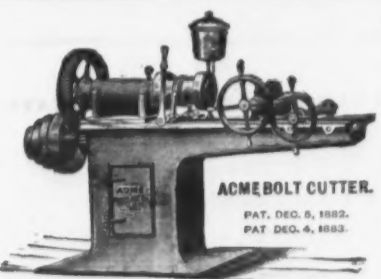
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To Conform to a Flat or Crowning Pulley.

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BROOKLYN, N. Y.**DROP****HAMMERS,
FORGINGS and
POWER PRESSES.**

the society's hands had been reduced during the year from £108,545 to £60,006. The number of members was 28,983, being a decrease of 563. The total income had been £63,335. Sickness had cost the society £18,189, and benevolent grants £4492. In shipbuilding the men had to submit to several reductions of wages. Locomotive, marine and stationary boiler hands had been pretty well employed, as well as those engaged on structural work.

A Recording Aneroid Barometer.

Although instruments which automatically record variations of atmospheric pressure can scarcely be classed among the more recent inventions, the past few years have brought forth some important improvements, which are not only of purely scientific, but also of general interest. Before referring to them in detail it may not be out of place to remark that among the first of these recording barometers—more properly called barometographs—was that patented by Napier in 1848, and which was intended to mark the variations of atmospheric pressure during a period of 24 hours. Connected with the barometer tube of Napier's device was a vertical spindle carrying a card which had on its surface a number of radial lines and concentric circles. The radial lines represented fractions of inches, and the concentric circles portions of time. Above the card was a lever carrying a vertical pricker, which was made to rise and fall at certain regular intervals of time and to travel from the inner concentric circle to the outer one once in 24 hours. On the vertical spindle and underneath the card was fastened a grooved wheel, around which was passed a cord. One end of this was made fast to a float resting upon the column of mercury in the tube. The card had a fixed point representing 29½ inches, which at the commencement

The advocates for the platforms claim Economy in repairs, as a broken end sill can be renewed without disturbing the end posts, bracing and covering of the car; also greater facilities in shifting cars in the yards, it not being necessary for the trainmen to get up on top of the cars to apply the brakes, and in extreme cold weather trainmen can ride on the platforms, where they are protected against the wind. A position of safety is also afforded them on roads having tunnels and through bridges, where they can be out of danger and still have control of the brakes. Further, with the growth of business and the increased value of property in cities and on docks, it becomes necessary to make curves so sharp that the corners of the cars are liable to strike. This liability and the resulting damage is prevented by the end platforms.

1. Please state how many freight cars belonging to the company which you represent, are built with platforms, and how many without?

2. Which method do you prefer, and your reasons for the same?

3. What action would you advise the association taking with a view to adopting either one or the other, or a compromise of both?

Pelton's Expanding Reamer.

Messrs. S. W. Card & Co., of Mansfield, Mass., have secured the exclusive right to manufacture and sell in the United States the reamer shown in the annexed cut and patented by T. G. Pelton, of Lyons, Iowa. The device, as will readily be understood, can be adjusted to a certain limit to compensate for wear, and also to vary the sizes of holes at will, by screwing up the taper plug. This will often save the cost of making special reamers or drills that are of no use except for one job. The expanding reamer will make a hole from 1½ inch under-



Pelton's Expanding Reamer.

size to 1½ oversize on small sizes, and from 1½ inch undersize to 1½ oversize on large sizes. It is adapted for jobbing shops and manufacturing, being suitable for brass, iron and steel, and is furnished either with taper or straight shanks as desired, and in sizes from 3/4 inch to 1¼ inches.

Work on the Aqueduct.

There are 25 shafts and four portals on the Croton Aqueduct upon which work has been commenced, and in 10 instances the shafts have been excavated to the grade of the tunnel. That is on the line between High Bridge and the Croton Dam. There will be six more shafts on Manhattan Island. The rock has proved generally very good for blasting, and it is hoped that a large portion of the tunnel will not need a brick lining. As a general rule the amount of water encountered in the shafts and tunnels has not been large enough to be a serious obstruction. The water in two or three of the shafts is in such quantities as to require powerful pumping apparatus. Work on the tunnel has been begun wherever the shafts have reached its grade. In almost all cases the shafts and portals have been provided with improved plant for hoisting material and for the production of compressed air, which is used for the rock drills. There are also erected at all the shaft sides machine and blacksmith shops, boiler-houses, lodging-houses and such other buildings as are necessary for the contractors' operations. On the lower part of the line, where the shafts are comparatively shallow, the grade of the tunnel has been reached in many instances or will soon be reached. On the upper part of the line, where some of the shafts attain a depth of 400 feet, it will be several months before the grade is reached. On May 15 the work will have been in progress four months, and at present there is no reason to doubt but that it will be completed within the period—33 months—prescribed in the contracts. The entire length of the line under contract is about 25 miles. The section between High Bridge and Central Park is not yet under contract. A portion of that—about 13,000 feet in length—is to be in a rock tunnel, including the portion under the Harlem River. The lower part from 137th street to Central Park is to consist of several lines of large pipes, the location of which has not yet been decided upon by the Aqueduct commissioners. It is proposed to connect these pipes with the large reservoir in Central Park in the vicinity of the north gate house.

End Platforms of Freight Cars.

A committee of the Master Car Builders' Association, consisting of Edward B. Wall, Columbus, Ohio, B. K. Verbyck and G. W. Cushing has issued the following circular with the request that replies be forwarded to the first-named gentleman:

The committee appointed to report on the comparative advantages of the two methods of constructing freight cars with and without platform timbers or end sills projecting from the end of the car requests your answers to the following inquiries; and in order that their report may be ready for your consideration at the next convention, they especially urge that replies be forwarded before May 15, as they will not be able to include any received after that date.

There are in general use in this country two distinct methods of framing the end floor timbers of freight cars. In all of the appliances for the ends of freight cars, such as deadwoods, couplers, draft riggings, steps, brakes and running-board extensions, these two methods have to be considered, and the details of the appliances arranged to suit either one or the other. Of a consequence, complete uniformity cannot be secured until either one or the other, or a compromise of both, is adopted by the association.

The advocates of the method in which the platforms are dispensed with claim: Economy in first cost; minimum distance between cars, enabling longer trains to be placed on shorter sidings, and facility for trainmen in passing from one car to another.

A firm in Glasgow, Scotland, is now manufacturing ribbon wire for electric purposes. It is nearly rectangular in section, and thus can be wound into a smaller space than round wire, while its greater flexibility renders it far more easy to manipulate. It is marked with the same numbers as the corresponding sizes of round wire, and is delivered on wooden bobbins.



CRONK'S WROUGHT IRON BARN DOOR HANGER AND STAY ROLLER.

In offering to the trade of 1885, our Celebrated Wrought-Iron Hangers and Stay Rollers, in connection with our Hangers. It is made complete, only requiring hammer and nails to attach it to the building. We make the broad claim that whoever uses our Hangers and Iron-Clad Track has the best device known for sliding doors.

We also offer a new device for setting fence posts and hop poles, fully illustrated here. We claim that we can set with this device more fence posts in a given time than by any other means. To use the bar, first penetrate the soil to the depth required with the smaller bar (see cut), then apply expander or shell, and enlarge the hole to suit the size of the post. These bars all have forged steel points which may be sharpened when dulled. We guarantee that one man can save the price of the bar in setting posts one day, as he can make from 40 to 60 holes each hour.

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WE beg to call the attention of the Trade to the high standard of excellency and perfection now attained by our Ship Augers, Ship Auger Bits and Car Bits; and that they are superior to all others made in the world seems to be the universal verdict of both dealers and mechanics.

Another manufacturer may have an older man, and may use the same machinery used by L'Hommiedieu in Chester, Conn. in 1814, but as the world advances many improvements are made, and we are producing our Ship Augers to-day with new and the most improved machinery that exists, and we employ the most skilled makers in this country.

While other makers have been running short time the past winter, we have been obliged to run full time, and even extra at times, to keep up with our orders.

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Crawford's Patent Adjustable
Screw Holder and Driver
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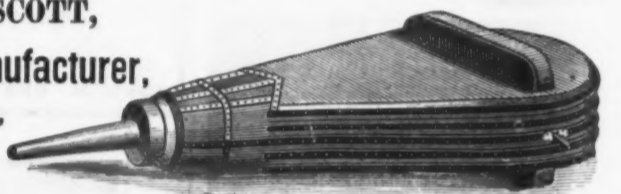
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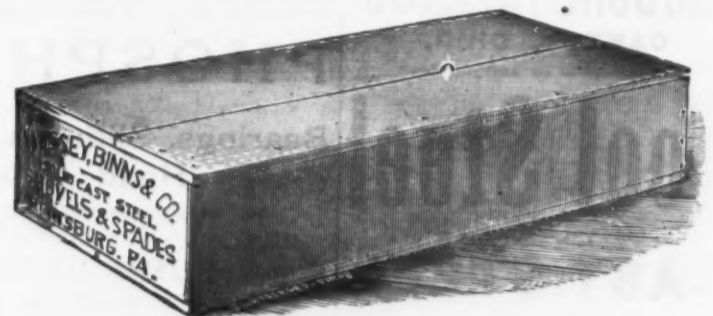
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The Henderson Mold for Casting Steel.

The compression of steel and other materials in molds and the expulsion of gaseous matter from the material by gaseous pressure has been the subject of considerable study. Mr. James Henderson, of Bellefonte, has recently brought out a form which is represented in the accompanying illustration and which is specially designed for cannon ingots. It is formed mainly in a flask whose walls are perforated by orifices for the escape of gas, the body of the flask being constructed in sections connected by flanges and bolts. The flask is closed at its lower end by a plate. The interior of the mold in the flask is formed in the usual manner of damp sand rammed around a pattern, which, for convenience of being drawn from the mold, should be made in sections, held in their proper relative positions to each other by means of pins. When the mold has been formed the sections of the flask are separated, the pattern is drawn out, and the sand lining of the flask is thoroughly dried before the sections are put together and the fluid metal is poured. The head of the mold is formed by preference of cast steel, which is connected with the sand-lined flask beneath by means of flanges and bolts, and the joint between the flask and the head is made tight, preferably by means of a gasket of copper which is applied to corresponding grooves formed in the adjacent rims of the flask and head, which should be faced off truly to make a close joint. The gasket may have a circular section before it is applied to the grooves, so that when the head of the mold is drawn down to the upper end of the flask by the bolts the gasket will be compressed and will close the joint hermetically. The upper end of the head of the mold has a cover fitted to it, and the joint between the cover and the head of the mold should be made gas-tight by some suitable means—such, for example, as a gasket of soft metal or an inverted cup of thin sheet metal secured to the cover, which cup may be expanded by the pressure of gas generated within the mold.

The gaseous pressure for compressing the material within the mold after its head is closed is produced preferably by the burning of a powder composed of 80 parts by weight of saltpeter and 20 parts of charcoal, which may be used in quantities of about 147 grains for each cubic inch of space left in the head of the mold between its cover and the surface of the cast metal. The mold must be made strong enough to withstand this pressure. This quantity of the gas material will produce a pressure on the cast metal of about 8 tons to the square inch. For the purpose of holding the gas material a chamber is secured to the under side of the cover. This chamber is closed by a bottom which is fitted tight in the wall of the chamber, but is not fastened thereto. In order that the gas material may be ejected from the chamber a plunger is fitted in the cover, with the rod of the plunger extending through a hole in the cover and fitted at its upper end with a knob, which may be struck by a hammer, and for the purpose of limiting the downward movement of the plunger a collar is secured to the plunger rod. In order to facilitate the displacement of the bottom of the chamber a small wooden plug is introduced into the chamber between its bottom and the plate of thin metal of the inverted cup which forms the top of the chamber next the under surface of the cover of the mold.

When the mold is to be filled with fluid steel it is opened at the top by the removal of the cover. The fluid steel is run into the mold preferably by means of a pipe of cast iron inserted in the mold, and the mold is nearly filled—say, within 6 inches of the upper end of the head. It is preferred to use a plate of cast steel, previously heated to a white heat and lowered upon the fluid metal, and the cover of the mold, with the charge of powder in its chamber, is applied and made fast. Then the charge is discharged from its chamber by a blow upon the knob of the plunger. The powder is ignited by the heat of the plate, upon which it falls, and, as the gases generated by its ignition are confined within a small space, a strong gaseous pressure is produced, which compresses and condenses the steel. As the flask portion of the mold is lined with dried sand, which is pervious to gas, the pores of this pervious lining permit the escape of the gas from the steel which is in the flask portion of the mold. The steel is subjected to the pressure of the gas generated in the head of the mold from the gas material. As the head of the mold is of metal which is impervious to gas, it prevents the escape laterally and upward of gas from the gas material, so that it acts with its full pressure upon the metal in the mold.

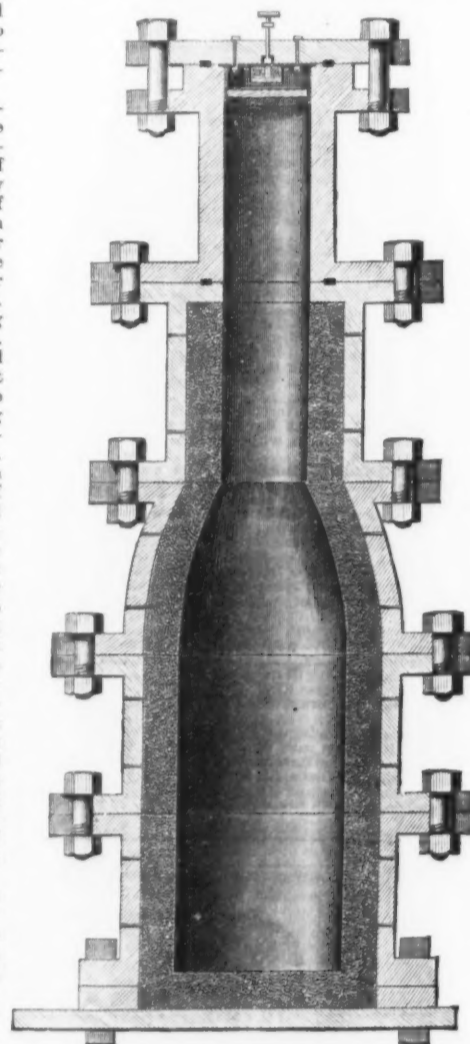
From the foregoing description it will be perceived that the invention is characterized by the combination of the body of the mold pervious to gas with a head that is impervious to gas, the former permitting the escape of gas from the cast metal, and the latter confining the compressing gas generated from the gas material, so that the compressing gas exerts its pressure on the cast metal. The invention is not restricted to the use of the above-described compound of charcoal and saltpeter as a gas material, as other gas materials may be used for the purpose.

It is preferred to use for the pervious lining a compound of clean, sharp sand, such as fire sand, intimately mixed with magnesian lime in the proportions of 95 parts by weight of dry sand to 5 parts of magnesian lime. The mixture is made by slaking the lime and adding sufficient water to make it of a creamy consistency, and then intimately mixing it with the sand. It is better to paint or wash the inner surface of the mold with a hardening mixture of rye flour and water.

This wash should be thoroughly dried upon the mold before the latter is put together to receive the fluid steel.

In place of expelling the gas-making material from its chamber and igniting it by the heat of the casting, it may be ignited in the chamber by electricity. In this case the electricity is conducted to the gas material by means of a duplex conductor, and the two wires of the conductor are connected by a platinum wire in the charge of gas material, so that the platinum wire is ignited by the electricity and fires the gas material. It is Krupp's practice to compress ingots of steel by gaseous pressure in unlined flasks, and he declares it to be better to use a gas material that generates heat in the top of the mold to keep the metal hot at the top as long as possible, while the lower part is allowed to grow cool. The castings do not require annealing.

The report of the United States Gun Foundry Board that recently visited Europe to gather information about guns and armor for our navy gives the highest praise to the liquid compression of steel as practiced by Whitworth. They say: "As to the treatment of metal after casting there can be no doubt of the superiority of the system adopted by Sir Joseph Whitworth & Co. over that of all other manufacturers in the world. The system consists in compressing the liquid metal in the mold immediately after casting. The wonderful character of Whitworth steel has attracted great attention, and may be stated as indicating the present culmination of its success. From a Whitworth 9-inch gun lately constructed for the Brazilian Government there was fired a steel shell, which, after perforating an armor plate of 18 inches of wrought iron, still retained considerable energy. The weight of the shell was 403 pounds, the charge of powder 197 pounds, and the velocity about 2000 feet. The shell is but slightly distorted.



The Henderson Steel Ingot Mold.

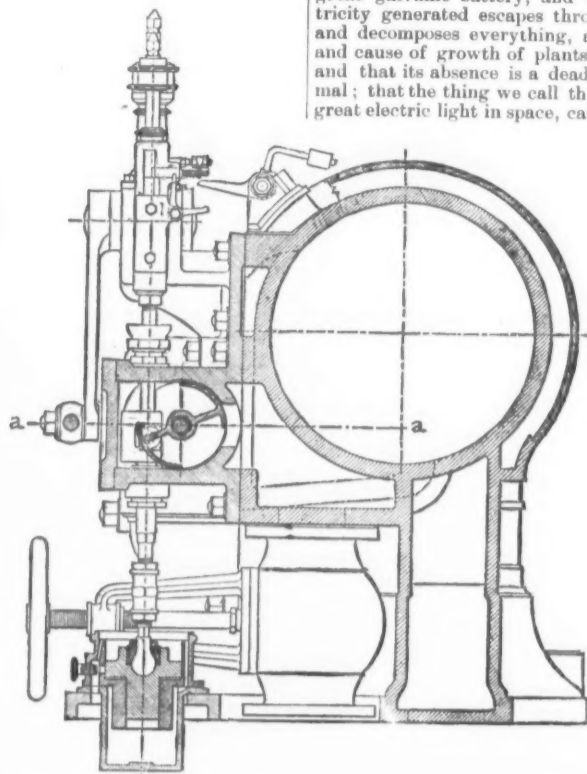
The tests of the metal of which it was made show a tensile strength of 93 tons per square inch and a ductility of 9 per cent."

The History of a Coal Pool.—The following story of an attempt to establish a coal pool in Detroit was told by one of the participants to a correspondent of the *Railway Age*: About a year ago the Baltimore and Ohio, Columbus and Hocking Valley, Tuscarawas Valley, Ohio Central and Wheeling and Lake Erie and the dealers representing the mines on these roads agreed to form a pool which should embrace all the mines on these lines of road, and which should hold prices for coal at a reasonable point, and also secure paying rates for hauling that product to the roads. The method adopted was to organize a company which should make prices on coal, receive all orders and distribute them among the mines in such a way as to keep the tonnage of each road proportionately equal to what it had been during the previous period, when each road had been satisfied with its tonnage, but not with prices. The company was organized with an experienced man as its president, but the plan proved a failure almost at the outset. It was found that one of the roads, instead of keeping its agreement to do all business through the new company, had filled the country with secret agents who were taking orders and sending them directly to the mines on that road, while at the same time it was claiming its proportion of orders taken by the new coal company. This is the outline of the story as told. The moral of the tale, as emphatically stated by the narrator, was to the effect that good faith and the keeping of agreements were unknown among railway men in the struggle for competitive business.

George J. Pendleton, Minister to Germany, and Thos. M. Waller, Consul-General to London, sailed on Saturday for their destinations.

(Concluded from page 1.)

and the stems are permitted to drop to their lowest position in the dash-pots, and thus rotate the valves, cutting off the steam from the cylinder. The point of cut-off, from nothing to full stroke, is regulated, as al-



The Trenton Engine.—Fig. 3.—Cross Section of Cylinder and Steam-Chest on Line b b of Fig. 3.

ready stated, by a parabolic Watt governor, which moves the two sliding wedges mentioned above, against which the triggers strike, earlier or later, in the stroke of the piston. The points of admission, exhaust and cushioning are readily adjusted from the outside of the cylinder or steam-chest by means of sleeves and lock-nuts. All bearings are bushed with hard phosphor-bronze.

Fig. 7 is a rear view of a Class B engine, intended for higher rotative speeds than that of Class A. This engine is similar in general design to the one just described, differing, however, materially in the valve gear and governor. The valves, two in number, are similar to those of Class A engines, except that the ports, four in number on each valve, are longitudinal instead of helical. The valves are cylindrical and

editor of a new journal called *Problems of Nature*, because it enunciates the views which Mr. Dean summarizes as follows: The original crust of the earth was condensed electricity called mica; that all rocks, minerals and soils are decomposed mica in various degrees; that the earth is hollow, and is a great galvanic battery, and that the electricity generated escapes through the crust and decomposes everything, and is the life and cause of growth of plants and animals, and that its absence is a dead plant or animal; that the thing we call the sun is only a great electric light in space, caused by a con-

and tempered violet to orange yellow; crucible steel, hardened and tempered straw yellow; hard-bearing metal—copper 83, zinc 17; crucible steel, glass hard. The

year, with some indication of rates of wages and with incidental attention to various other interesting features. These annual surveys have been based upon reports sent

building business in some portions of the country, notably in certain of the Southern States. Just what portions of the country are to be most prosperous, and what sections

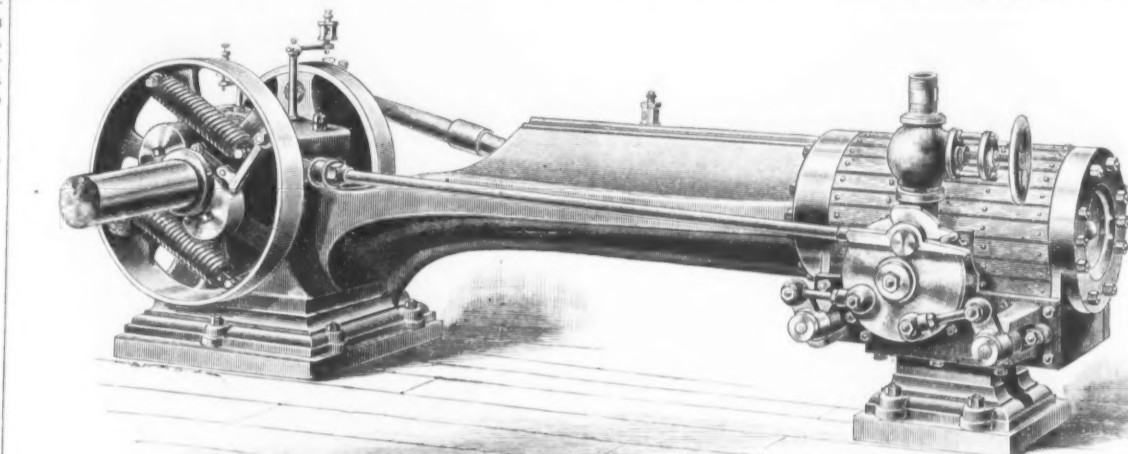


Fig. 6.—Rear View of Class C Engine.

test was made by drawing a cylindrical piece with a conical point along a polished surface of the metal to be tested, the arrangement in its detail insuring great accuracy.

Prospects in the Building Trades.

The following interesting account of the prospects in the building trades appears in *Carpentry and Building* for May:

In the early spring season, when the build-

ing business is about to open, every one who is connected with any of the building trades, or who supplies materials or is in any business the prosperity of which is at all dependent upon activity in the building trades, anxiously inquires, What are the prospects of the building business this year? Is the country at large to have an active building season, or is it to be very dull? If the country at large is not to have an active building season, in what sections will there be an exception to the general rule? Where is the largest amount of building to be done, and what is to be the character of the structures put up? These who are employed at day's wages, and who happen to be living where business is dull, are anxious to know in what

will probably do very little, will be shown by what follows.

LATENESS OF THE SEASON.

Many of our correspondents direct attention to the fact that, owing to the lateness of the season the present year, the 15th of April was rather early to give a satisfactory account of the building outlook. The lateness of the season seems to affect the country very generally. It is as noticeable in our reports from the South as from the

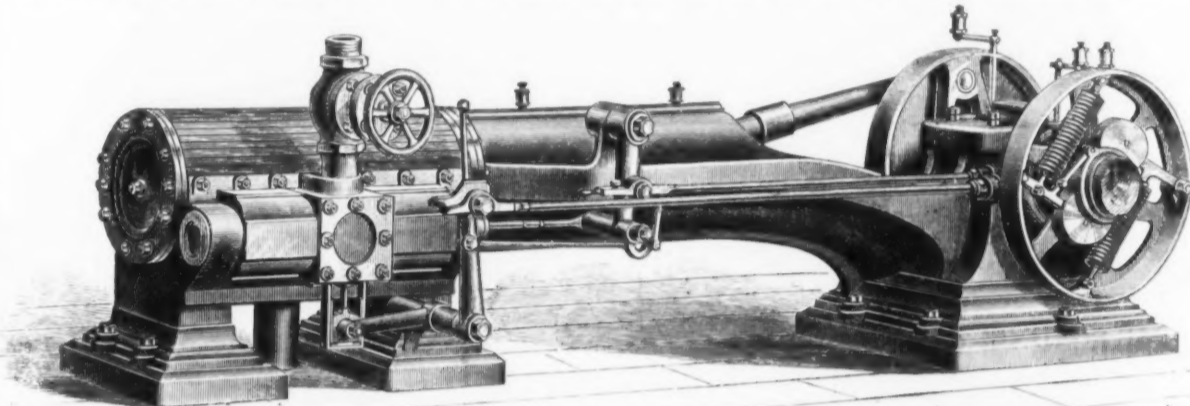


Fig. 7.—Rear View of Class B Engine.

such a report as we have undertaken to prepare, and therefore it has been adopted in this case. The replies that we have received from our correspondents this year are fuller and more complete than we have ever before had, and accordingly we feel that we are in a better position to convey a true conception of what the building business is to be during the season just opening than ever before.

THE GENERAL OUTLOOK.

From the most casual inspection of the multitude of letters which we have received it is evident that the present is to be fully up to the average as a building year. In very few sections of the country, however, do we hear of what may be described as a building boom. Some of those towns which have been so unfortunate during the past year as to have a considerable portion destroyed by fire present unwelcome activity, and a few towns in sections of country that are being opened up by new railroads, or where new mining enterprises are being started or unusual developments of other industries are taking place, are the scenes of very active operations. For the most part, however, building seems to be upon a very stable foundation. The speculative element is not much alluded to by our correspondents, and those building which are being put up, what-

North, and is alluded to as frequently by our correspondents in the Central States and extreme West as in the East.

WAGES.

With reference to wages it may be said that there is no probability of any material advance in any section over the rates commanded last year. On the contrary, there seems to be a weakening in rates in many directions, and the expectation of rates ruling somewhat lower through the season than those which were current last year is expressed by many of our correspondents, especially by those in the smaller towns where business is not very active. In the large cities, where unions control rates almost exclusively, full figures will probably be maintained. On the other hand, any attempt to force rates higher will result disastrously, and will stop many enterprises that will otherwise go forward. In general it may be stated that rates in those towns where building is to be more than the average during the present season will be about the same as ruled last year. On the other hand, where building is at all slack, rates may be from 10 to 15 per cent. lower than last year. Of course there are exceptions to these general rules, and, while they may apply to some trades in certain localities, they may not apply with equal force to other trades. In a summary as general as this must be, wherein we attempt to consider the five leading building trades, it is very difficult to lay down rules to which there will not be many prominent exceptions. In the towns in the extreme West, especially in the mining districts, and also in the Southwest, on the extreme outposts, so to speak, rates are named by our correspondents which seem extravagantly high in comparison with those rates which are paid for like work in the Central and Eastern States. When the surroundings of the work are considered, however, the cost of living, and the uncertainty of steady employment, it is believed that those mechanics who receive the high wages named are in reality far less favorably placed than many in the older sections of the country who receive wages represented by figures no more than half as great. It would be very difficult to present a reliable table of wages showing rates throughout the country, on account of the difference in customs in different sections. Not a few of our correspondents, having in mind country work, in which the mechanics in their towns are largely engaged, report wages at certain figures, board included. Others quote wages at eight hours, while still others allude to the fact that in their localities, for certain classes of work, notably masonry, brickwork and plastering, it is almost the universal custom to agree by the perch, by the 1000 or by the square yard, as the case may be, and not at day's wages. Many of our correspondents also allude to the fact that it is difficult to name a rate of wages, since mechanics in their neighborhoods, of the same trade, are working at many different rates, varying sometimes as much as \$1.50 a day, between the highest and lowest, the high figures being for first-class or specially talented workmen, while the low figures are for men who scarcely find work even in the most active seasons, on account of their lack of skill. A large number of our correspondents emphasize this difference between unskilled and skilled labor.

SMALL MARGINS.

Another fact to which many of our correspondents allude is that building operations during the present year for the most part

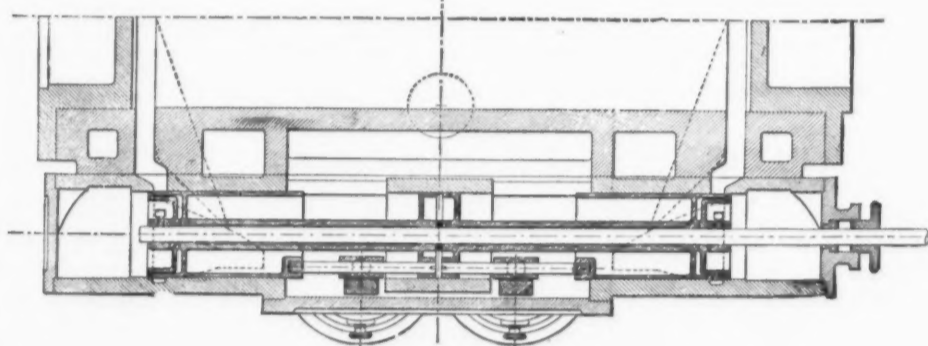


Fig. 4.—Sectional Plan of Steam-Chest and Half-Plan of Cylinder on Line a a of Fig. 4.

balanced, both firmly attached to one stem, and have a simultaneous rotary and sliding motion, the rotary motion admitting and cutting off, and the sliding motion, which is from a separate eccentric, exhausting and cushioning the steam in its distribution to and from the cylinder. The rotary motion varies with the action of the governor, while the sliding motion is positive and without change. The variation of the point of cut-off is from nothing to two-thirds the stroke. The governor which actuates the rotative motion of the valve is of the "crank-shaft governor" type, being a disk attached to the crank-shaft, and which contains weights held in equilibrium by helical springs.

The eccentric attached to the governor has a transverse sliding motion across the crank-shaft in such a direction that the point of admission of steam is unvarying, no matter at what part of the stroke it is cut off. The adjustment between the centrifugal force of the weights and the resistance of the springs is so nicely provided for that a change in speed of 3 per cent., it is claimed, will cause a change in the position of the weights equal to their extreme range, or a variation of the point of cut-off from nothing to $\frac{2}{3}$ stroke. This insures regularity of speed under the greatest variations of load. The Class C engines, introduced for high rotative speeds and the smaller powers embody the same features as those preceding, so far as their frames and governors are concerned. They have, however, but one eccentric, which engages a wrist-plate, and so imparts motion to the valves. The latter are among the most interesting features of these engines. In the main they are constructed similar to the Corliss valves, but differ from them, because of the introduction of an auxiliary port. They are rotated by an eccentric and wrist-plate which open the valves for the admission of steam to the cylinder very quickly, and retard their closing during the exhaust. The speed and power of this class are regulated by a centrifugal governor on the crank-shaft, similar to that used for Class B engines.

High Science.—C. W. Dean, of Evergreen Park, Ill., writing to the *Chicago Mining Review*, wants some of the scientific correspondents of that paper to overhaul the

according to the following scale, commencing with the softest: Pure soft lead; pure tin; pure hard lead; pure annealed copper; cast fine copper; soft-bearing metal—copper 85,

tin 10, zinc 5; cast iron, annealed; fibrous wrought iron; fine-grained, light-gray cast iron; strengthened cast iron—melted with 10 per cent. of wrought turnings; soft ingot iron, with .15 per cent. carbon—will not harden; steel, with .06 per cent. carbon—not hardened; crucible cast steel, hardened and tempered blue; crucible steel, hardened

as these cannot be satisfactorily answered from any ordinary source of information. It requires a very painstaking search, and one that can only be accomplished by voluminous correspondence. For several years past we have undertaken each spring season to present to our readers a bird's-eye view of the prospects of the building business for the

ever may be the section of the country, seem to be in direct response to actual requirements. While the general volume of building throughout the country at large will probably be fully up to the average, it is not to be inferred that all sections of the country will share equally in the general prosperity. There seems to be complete stagnation in the

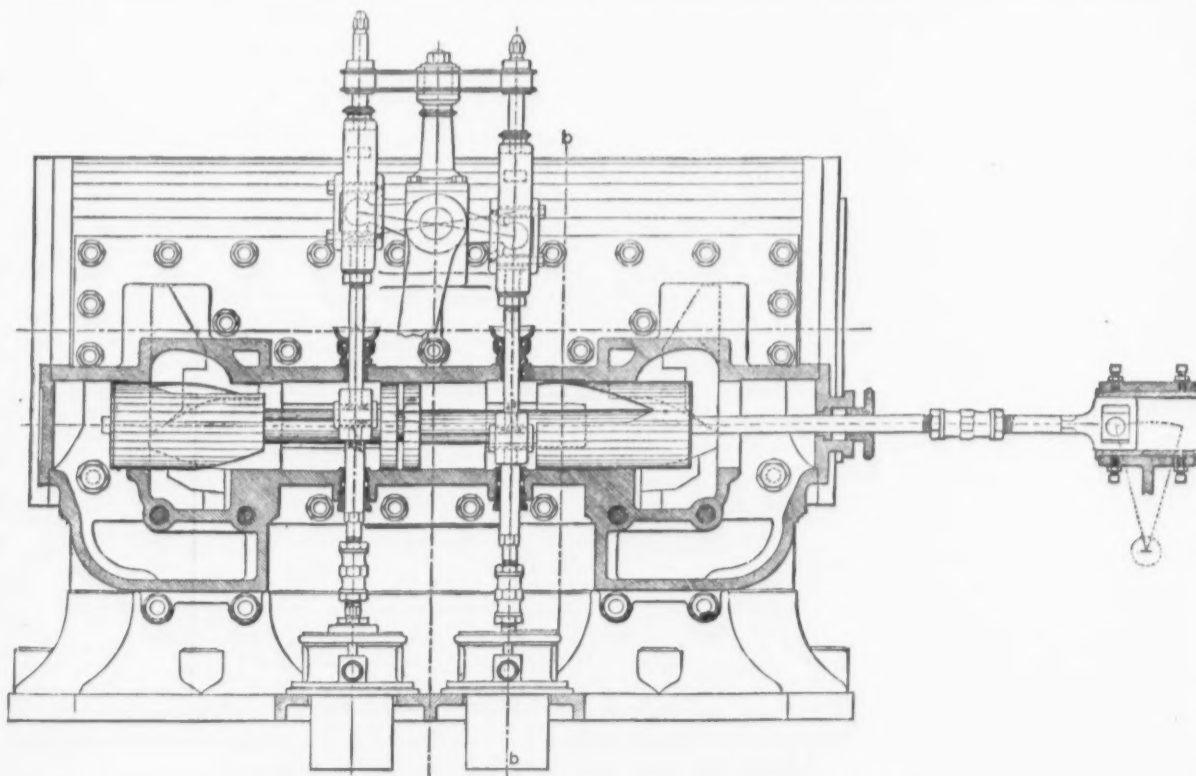


Fig. 5.—Vertical Section Through Steam-Chest and Elevation of Cylinder.

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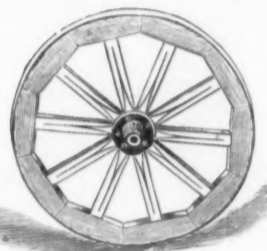
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The Strongest and Lightest Running Wheel known.



It will not Shrink in any Climate. The Tire Cannot Come Off.

It has **TEN** spokes of thoroughly seasoned wood, and each spoke is supplied with a separate felloe. The hub is of chill cast iron, and riveted firmly to the spokes, which are so cut as to counterbrace each other. The spokes are keyed from the center after the tire is shrunk on. *This wheel will not shrink or give in any weather or climate, and the tire cannot become loosened.* An oil hole is drilled into the hollow washer of the hub, and the oil distributes itself along the bearings while the wheel is in motion. The wheel revolves on a fixed shaft or axle, which passes through the end of the handle, and is a brace to the barrow. This wheel cannot be broken or weakened by ordinary usage, and will last a lifetime. It is well painted. *We guarantee it superior to any other WOOD WHEEL.*

JACOBS' PATENT STEEL SPOKE WHEELS.



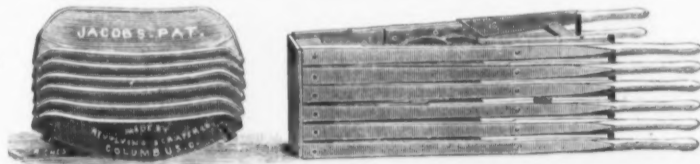
Wheel Complete.

Wrought-Iron Tire. Steel Spokes.



Without Hub—Showing Construction.

These wheels are so constructed—having spokes tightened from center—that the tire cannot come off or the spokes become loosened. Hubs hardened on inside. Oil hole in hub. Diameter of wheel, 17 inches. Wrought-iron tire, 1½ inches wide. *Steel spokes. The Best Barrow Wheel Manufactured.*



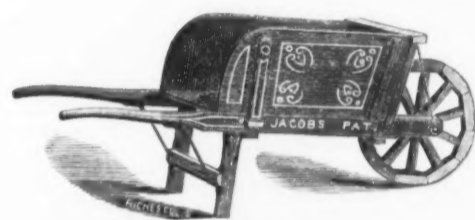
The above cut shows the manner in which our *Railroad, Ore, Wharf and Steel Tray Barrows* are packed for shipment. This insures lowest rate of freight, and they can be quickly and easily set up by following the simple instructions sent with each half-dozen Barrows. In this shape Barrows require much less room for storage, and can be as easily set up as if received with Tray fastened to Frame.



"COLUMBUS" STEEL TRAY WHEELBARROWS.

The Tray is stamped from *one solid plate of steel*. Steel Spoke Wheels 17 inches in diameter. Wrought-Iron Tire, 1½ inches wide. These Barrows, while much *lighter* than those having iron frames, are *equally strong* for all practical purposes, and will stand the roughest usage. Two sizes. No. 1, capacity 3½ cubic feet, for Earth, Sand, Ore and Foundry use. No. 2, capacity 5 cubic feet, for Coal, Manure, Sawdust, Ashes, &c. Pack for shipment same as R. R. Barrow.

We make three sizes of these Scrapers. No. 1, capacity, 7 cubic feet of earth. No. 2, 5 cubic feet of earth. No. 3, 3½ cubic feet of earth. Furnished with or without *solid steel shoes or runners*, as desired. The bails are of refined iron, with strong and perfect working swivels. Bows nest and handles crate compactly for shipment.



GARDEN OR FARM BARROW.

Set Up.

Double Frames and so constructed that by simply removing one bolt (the axle) and two nuts they can be folded flat down (see cut) and shipped at lowest rate of freight. Three sizes.



Folded for Shipping.



STRAIGHT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. Strong, well-made, iron strapped over bottom and bolted together. For stone or pig iron, &c.



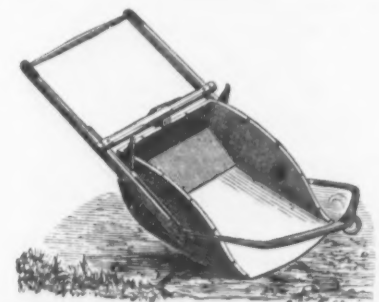
BENT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. 17¼-inch tire. Well ironed and bolted. Extra strong.



STEEL BOTTOM STONE BARROW.

Bottom and Dash formed of *one plate of steel, one-fourth of an inch thick*. Steel Spoke Wheel. The strongest and best Stone Barrow manufactured. Very durable.



THE AUTOMATIC REVOLVING ROAD SCRAPER.

Three sizes. 30, 33 and 36 inch. Both Steel and Wooden Bottom.



RAILROAD OR CANAL BARROW.

With Jacobs' Patent Wood Wheel. Bent Tray, full sized, planed and well finished.



RAILROAD OR CANAL BARROW.

Same as above, except with Jacobs' Patent Steel Spoke Wheel.



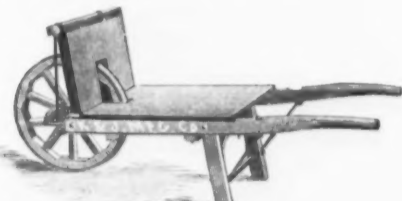
ORE OR MORTAR BARROW.

With Jacobs' Patent Wood Wheel. All hardwood. Bowl dovetailed together and firmly nailed.



OPEN BOTTOM BRICK BARROW.

With Jacobs' Patent Wood Wheel. Folds for shipping same as Garden or Farm Barrow.



TIGHT BOTTOM BRICK BARROW.

Same as above except having Closed Bottom. We furnish either style of these Barrows with *Steel Spoke Wheel* when specially ordered.



WOOD OR BARK BARROW.

Wheel same as above. Body and Dash strapped with heavy iron. Well finished. For Wood, Bark, Bales, Boxes, &c.

ILLUSTRATED CATALOGUE AND PRICES FURNISHED ON APPLICATION.

will be conducted on very small margins. Materials are cheap, labor in many cases is low, and yet in spite of these conditions the pressure is for buildings at such low cost as to leave comparatively small margins in the hands of the contracting builders. We think, however, that in many cases these margins are small only in comparison, rather than in reality. Where high prices have ruled for a considerable period and low prices succeed them, even though the same percentage of profit may be made, the feeling exists that times are hard and margins are small. Our impression, based upon many reports before us, is that the present year will be one fully up to average profits for contract builders, and that those mechanics who are accepting slightly less wages the present year than for former years will yet find themselves at the close of the season fully as well off as heretofore. Everything is being conducted on a lower basis than heretofore.

THE NORTH ATLANTIC STATES.

We have scarcely room to summarize each individual State. The best we can do is to give a general view of the country in sections. Commencing at the extreme northeast and taking into account that group of States known as the North Atlantic States, comprising Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island, it seems that the building trades throughout the territory named are in about the average condition of the country at large. In the State of Maine, for the most part, the outlook is not favorable. This in part, no doubt, is due to the early date of our advices, considering the latitude of the State. Several of our correspondents allude to the fact that the building business, in many instances, does not commence until late, and that people scarcely know yet what will be done. Wages throughout Maine average very much as they did a year ago, and no very great changes are anticipated during the season. In New Hampshire the outlook is somewhat better, and the same satisfactory condition extends into many of the towns in Vermont. A fair trade is anticipated at the capital, also at St. Johnsbury and in several of the other more important towns throughout the State. In Massachusetts both good and bad reports are at hand. In those towns where manufacturing is prosperous a fair amount of building is anticipated, and in those which have apparently got their growth, for the time being at least, mechanics are for the most part engaged upon repairs and alterations, so that they are not particularly enthusiastic. Dwellings are mentioned by our correspondent as being largely in demand. Connecticut is in much the same condition as Massachusetts, while Rhode Island reflects the general prosperity of the district of which it is a part. Building in Providence promises to be fairly good, with no material change in rates of wages.

NEW YORK.

The general average throughout the Empire State is perhaps as good as through any State from which we have reports. There are very few towns of any importance in New York that report less than a fair trade. A notable exception to this, however, is Albany, in which our correspondent says there will be but little done in comparison with former years. The average wages of carpenters may be given at about the same figure as last year—namely, \$2.25 per day. In New York City wages rule higher, but, considering the cost of living, it is probable that the mechanics of the metropolis do not any more than keep even with their friends in the country. In New York City it is estimated that there will be a slight falling off in the amount of building this year as compared with last year—that is, measured by dollars. When the area covered or the material consumed is considered, however, it is possible that the shrinkage will be less noticeable. Based on the estimates and plans filed during the first quarter, it would appear that residences on the west side of the city and a large number of improved tenement houses, variously located, will be the leading features of this year's business. Many of our correspondents in this State refer to the lateness of the season, which has greatly retarded building operations. Several allude to the fact that frost was yet deep in the ground at the time of writing (from the 12th to the 15th of April).

CENTRAL ATLANTIC STATES.

New Jersey does not seem to share the general prosperity of the Empire State, although the prospects are not specially depressing. The outlook in many of the towns at present seems to be less favorable than a year since. In Pennsylvania, on the other hand, the prospect is about as favorable as through New York State. All the towns and cities of real commercial importance from which we have reports indicate that trade will be fully up to the average, while a number of them anticipate an unusually satisfactory season. In Philadelphia the outlook is favorable, and wages, it is expected, will range at about the same rates as were paid last year. The outlook in Delaware is considered scarcely up to the average. Some towns in Maryland report a very good trade in prospect, while others anticipate only an average business. Building operations in Washington are not far from the average, with some important public work in contemplation. A few of the towns in Virginia anticipate a good trade, while many of them are comparatively at a standstill. In West Virginia the condition is much the same. The outlook is considered very gloomy in Wheeling, owing in some measure to changes which have been made in manufacturing operations. The substitution of steel for iron has had a depressing effect, since many mechanics are thrown out of work in consequence. It is presumed that, after the industries have become readjusted to the new order of things, prospects in the building business will improve. That city, and some others in the Ohio Valley, suffered severely a year since by the flood and have scarcely recovered from that disaster.

SOUTH ATLANTIC STATES.

In the South Atlantic States, embracing North and South Carolina, Georgia and Florida building is far less active than throughout the Central and Western States, and yet in comparison with what has been

done in some seasons the outlook may be considered as very favorable. In a number of towns in North Carolina the present outlook is reported as superior to that of a year ago. This is also true in part of South Carolina, although many of the towns in that State manifest very little activity. In some respects Georgia seems to be continuing, to a restricted degree, perhaps, the industrial prosperity which has characterized that State for a number of years past. No very large enterprises are reported, but our correspondents seem to think mechanics will be fairly well employed during the season throughout the towns of that State. In Florida there will be some summer hotels erected, as usual, and some residences, but, aside from the demand for buildings of this character, very little outside of the ordinary will be done. The town of Palatka, well known to many tourists, presents unwonted activity on account of the rebuilding in progress, made necessary by the fire which destroyed the business portion in November last.

THE GULF STATES.

Of the Gulf States, Alabama presents a somewhat favorable outlook in a few of its towns, although in general building operations will not exceed the general average. Our correspondent from Montgomery says that building in that city is better than it has ever been before. The work is principally in dwellings, indicating general prosperity of the inhabitants. The outlook in Mississippi is not unlike that of a year since. Many of the towns are in a state of absolute inactivity, and there is little industrial enterprise of any kind in any direction. In Louisiana the outlook is much the same. The unwonted activity in New Orleans, incident to the preparations for the cotton exposition, has been followed by a state of stagnation. We are assured that less building will take place in that city this season than before for several years. The interior towns do not offer any compensating advantages. In Tennessee the outlook is not considered favorable, and in many towns there will be comparatively little done. Nashville, Chattanooga and Knoxville will probably do about as much as usual, although our correspondents are not specially sanguine. Our reports from Arkansas are favorable. The outlook in many of the towns is better than the average, and, as contrasted with the reports of a year since, the outlook is very bright indeed. Wages at the present time and through the winter have ruled in many cases less than during last year, but it is expected that as soon as the season is fairly opened rates will be restored.

THE SOUTHWEST.

Our reports from the Lone Star State are various. Some of the towns in those portions of Texas which are old in comparison with others more recently settled indicate that a fair amount of building will be done, although there are exceptions to this rule. The rates of wages quoted are for the most part high, in comparison to those paid throughout the Eastern and Middle States, and yet the prospects for steady work, which are oftentimes quoted as less favorable than the present building activity would seem to indicate, prove that these rates are only fair under the circumstances. New Mexico, lying to the northwest of Texas, is in some respects a portion of the same general territory. The western part of Texas is largely devoted to the cattle business, as is also New Mexico, while both of the States in a certain sense are affected by the proximity of the sister Republic, Mexico, on the south. Throughout the territory of New Mexico the building outlook is very poor, from the fact that the industries of that section do not demand good buildings. Adobe huts seem to meet the general requirements, and our correspondents do not attempt to quote mechanics' wages. In Montana the outlook is better in some respects, although there is not very much doing at present. In this general section, being on the border line between Texas and New Mexico, is the town of El Paso del Norte, in which the building activity is reported as exceptional. A few words from a special correspondent may not be uninteresting. He says: "During the past two years portions of New Mexico and Arizona have in a measure been recreated. Some of the lazy and listless villages which characterized this portion of the world have been supplanted by active towns. Of all the places that have been transformed by the touch of capital and energy, El Paso del Norte, the town one leaves last before entering old Mexico, is the most changed. Before the railways came El Paso was composed of a few dozen adobe houses, pitched in careless confusion on the rolling sands, and the only inhabitants were a score or so of half-breeds and Mexicans, who passed a greater portion of their time sitting in the sunlight, drinking native wines. At present El Paso has handsome-made brick blocks containing shops and banks and good hotels. It has horse-cars and hacks, a plaza and churches. Five thousand people have already settled in the village, and its business as a supply town for the surrounding country is rapidly increasing. All the old-time listlessness has disappeared with the adobe huts. There is push and snap and energy manifested on every side. New buildings are constantly going up. If trade between Mexico and the United States increases, as surely it will, El Paso, which is on the highway between the two nations, will levy toll upon it all."

THE CENTRAL BELT.

Returning to the central part of the country, Ohio, Indiana and Illinois, severally and collectively, present a very favorable outlook indeed. There are few towns, comparatively speaking, throughout this belt in which mechanics will not be comfortably employed throughout the entire season. Wages are expected to rule about the same as quoted a year since. The lateness of the present season is specially mentioned by our correspondents in Illinois and Indiana. Lower wages are quoted in many portions of these two States as ruling at present and through the winter than last season. In most of them it is anticipated, however, that old rates will

be very nearly, if not entirely, restored. In a few of the towns in Illinois where building is not reported as very active the explanation is offered that poor crops have delayed many enterprises that will probably go forward the latter part of the season in case crops the present year are good. Towns in which building was the most active last year show a falling off the present year, indicating that in some instances regular growth has been more than anticipated, and that building enterprises must wait until the demand overtakes them. A correspondent from Chicago says that the demand at present in that city is largely for cheap tenements and small dwelling-houses. Indications are, however, that as the season advances there will be much more activity among landholders in erecting dwellings of a better grade. "Flat houses are also in demand in Chicago, and a number of enterprises of this character are on foot for the present season. The outlook in Chicago at the present time is hardly as favorable as a year since, for at that time more extensive buildings were contemplated than at present. It would seem, however, that the city will come very near doing an average amount of building during the season. Work will be plenty for all mechanics in the building trades in that city, unless some misunderstanding arises as to wages. At the present time, however, there are many unemployed men in Chicago. Public work is mentioned in a number of towns through the States last mentioned, as also in Kentucky. For the most part Kentucky seems to share the same general prosperity as characterizes the States just north of the Ohio River. Our reports for this State are very favorable indeed; the same general conditions apply to Michigan. Wisconsin seems also to be prosperous, and without an exception every town from which we have heard in that State reports building as fair or above the average.

THE NORTHWEST.

Of the States immediately west of the Mississippi, commencing with Missouri, on the south, good reports have been sent in. Missouri seems to be fully up to the general average, and Iowa occupies the same general rank. Some of our correspondents refer to the temperance legislation in the latter

but five cities or towns that come under our specification. In these building is reported as about up to the average. In Montana the outlook is less promising, while in Idaho the conditions are about the same. Mining operations in Nevada are less prosperous, perhaps, than some time in the past, and some of the towns which sprung up mushroom-like have already lost their population, and there is not a corresponding demand in other directions. Most of the mechanics in the larger places will find employment throughout the season, but no very great activity is anticipated at any point.

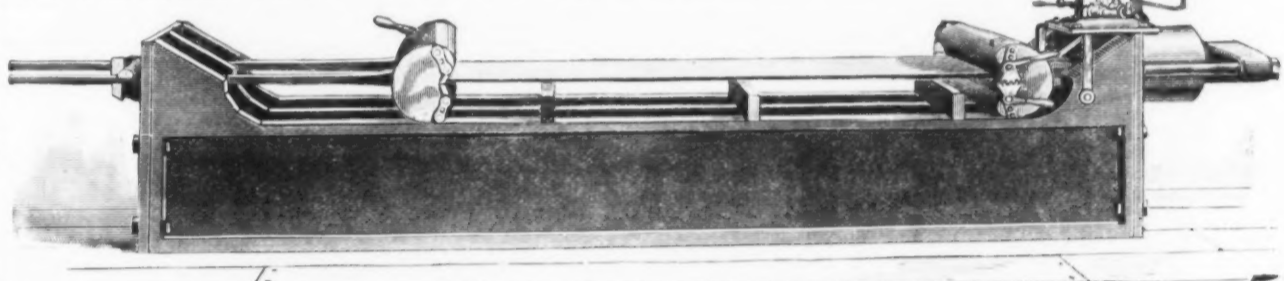
THE PACIFIC COAST.

Building is active in San Francisco and in some of the other cities and towns of California. More than the average, probably, will be done throughout this State the present year. Our reports from California and other portions of the extreme West are the least satisfactory of those that have come to hand, owing to the long distance to be traveled and the short time we could allow them on account of the early date of going to press. A fair amount of building, it would seem, will be done through Oregon and Washington Territory, although we have not the same abundant particulars as from sections nearer by.

The above account, long as it is, is a very brief epitome of a very large number of lengthy and circumstantial reports that we have received from our correspondents. As intimated at the outset, the responses to our inquiries have been more satisfactory the present year than ever before, as well as more in number. It is a matter of regret that we have not the space to present many interesting particulars of local building enterprises which our correspondents have sent us. We take this occasion to thank one and all for their favors, and to assure them that items of this kind are quite acceptable, even though we are unable, for lack of space, to lay them before our readers.

Britton's Machine for Leveling Sheet Metals.

We have the pleasure of laying before our readers in the accompanying engraving a general view of the machine for leveling



GENERAL VIEW OF BRITTON'S MACHINE FOR "LEVELING" SHEET METALS.

State as affecting building enterprises unfavorably. Just how this occurs we are unable to explain, and mention it only as an incident. The great Northwest as typified by Minnesota does not yet seem to be overdone. Building prospects throughout this State are reported good. Our advices from St. Paul are to the effect that the building season has fairly begun and that a great deal of work is already in progress. There is scarcely a block in the city, it is said, either in the heart or the lying districts, in which improvements are not to be made during the summer. A large number of contracts have already been let, and builders are reported to be well satisfied with the prices they are getting. In Minneapolis the outlook seems to be even more promising. The building permits granted in the three months ending March 31 aggregate almost \$1,000,000. Inasmuch as these permits are generally estimated at a figure far below the actual value of the improvements, our correspondent argues that the work really in progress at the present time is not far from \$4,000,000 in value.

Although Dakota has been overdone in some respects, a considerable number of her towns are still growing. In the main Dakota has been more rapidly developed from an agricultural standpoint than in respect to towns and cities. It would seem, therefore, that her mechanics have good prospects before them for some years to come, unless some unfortunate calamity overtakes this section of the Upper Missouri Valley. The towns in the valley of the Platte, Nebraska, also seem to be fairly prosperous. We have no unfavorable reports from that State, although there are several towns of importance from which reports have not reached us at this writing. In Kansas the outlook is more diversified. Some of the towns and cities report the prospects as very favorable while in others it is discouraging. It would appear, all things considered, however, that the building business in this State for the year will be about up to the average. Complaints of the backwardness of the season are mentioned by many of our correspondents throughout this State.

THE MOUNTAIN STATES AND TERRITORIES.

Considering the next section of territorial divisions as laid down on the maps, we reach Colorado, in which the outlook would seem to be only about average. Mining enterprises have lost some of the speculative energy that characterized them a short time since, and building enterprises are correspondingly less in proportion. A few of the cities and towns throughout this State indicate considerable activity, while others are more nearly at a standstill. In Utah many enterprises in building, particularly some of those conducted by the Mormons, are apparently at a standstill, owing in some measure to the adverse decisions of the courts affecting the government of that Territory and its peculiar institution. Mechanics are reasonably busy in Salt Lake City, and many repairs and alterations are in progress there, which, with some new work, give considerable activity to the building trades. Our correspondents think that the lull will not continue for any great length of time, but that, with questions that have been long pending definitely settled, building activity will be resumed. Wyoming Territory has

frame of iron of sufficient length to accommodate the sheets. The machines that have so far been completed have a length considerably greater than the longest sheets that are ordinarily manufactured, thus adapting them for exceptional uses. Provision is made for setting one of the grips so as to accommodate any length that may be desired within the extreme limits of the machine. The ends of the frame project above the sides a short distance. Through one of these raised ends two stay-ropes are passed, and are securely fastened in any required position by means of keys passing through slots in them. This construction will be clearly understood by a glance at the engraving. To the inner end of these rods there is secured a running head or grip which extends across the machine and rests on the side of it. In one side of this head, extending its entire length, is a deep groove giving the head a semi-tubular section. In this groove there is placed a pair of clamping jaws opening toward the back of the head, extending the whole length of the groove. A similar head provided with jaws of the same character is located at the opposite end of the machine, and is moved by means to be described further on. These jaws clamp the sheet or sheets of iron as indicated in the engraving. Their construction is of the simplest character, and in this respect Mr. Britton has made use of a device or construction that has been largely employed in many other instances. To the second head or the one at the right of the machine, as shown in the engraving, there is connected a pair of drag rods which pass through the end of the frame and terminate in a cross-head to which they are secured. This construction is also clearly shown in the engraving. Between the drag rods and fastened to the end of the

frame is a hydraulic cylinder or piston which is connected with the cross-head mentioned. The sheets to be leveled are clamped in the jaws at both ends of the frame. Water is then forced into the hydraulic cylinder, which moves the cross-head and consequently stretches the sheets of metal held in the movable head. The sheets are stretched just enough to overcome the inequalities to which attention has already been directed. The result is that they come out of the machine flattened, without buckle or swell, or, as Mr. Britton expresses it, thoroughly leveled. Instead of putting a single sheet into the machine at a time, a dozen or more sheets are put, the effect of the process being as satisfactory where a number of sheets are thus treated as where single sheets are treated. The change wrought in galvanized sheet iron, for example, by undergoing the process must be seen to be appreciated. It is safe to say, however, that those who have any need for smooth iron who have once used patent leveled iron will ever after be loath to accept the ordinary commercial article. Mr. Britton has deemed his invention of sufficient importance to warrant laying it before the ironmakers of the world, and, in order to bring it to the attention of the largest number, he proposes to attend in person the inventors' exhibition which is soon to be opened in London. He will have a full-size machine in operation at that exhibition. The galvanized iron that is now being sold in market by the Britton Iron and Steel Company, by Alan Wood & Co., and by other licensees, and branded "Patent Level," is treated by the process above described.

Iron and Steel in Germany.—Dr. Hermann Wedding has recently read a paper before the German Society of Mechanical Engineers on the value of steel for machinery, shipbuilding and railroad equipment. It was an earnest plea for the new material, without, however, bringing forward any new facts. The following presentation of the quantities of wrought iron and steel produced and used in Germany in 1883 is of interest, however, the unit being 1000 metric tons:

	Merchantable raw products.	Intermediate products.	Finished products.
Wrought iron	122	163	801
Steel	38	149	149

The following shows the distribution of the finished products:

	Wrought iron.	Steel.
Rails and rail fastenings	21	47
Railroad ties and sleepers	38	65
Axles, wheels and tires	18	71
Merchant and structural iron	509	22
Plate, sheet and tin plate	285	15
Wire	214	145
Pipes	29	8
Armor and projectiles	1	8
Parts of machinery, forgings, &c.	56	63

It will be observed that more than one-half of the steel sold is taken for railroad purposes, while merchant bar and structural iron calls for more than one-half of the wrought iron.

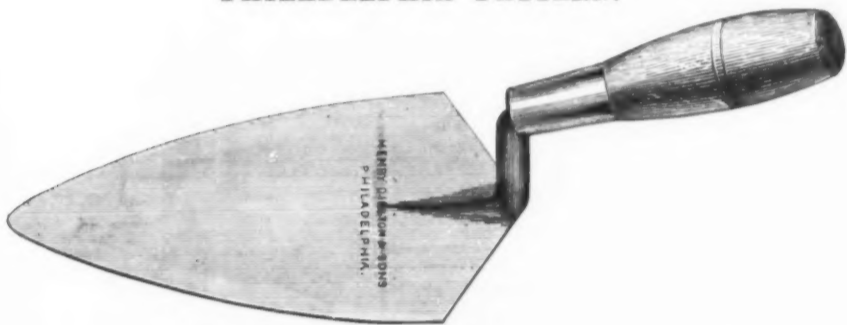
The catch of codfish off the Newfoundland banks last year amounted to 1,530,417 quintals, showing that the fisheries of that region are the most valuable in the world.

HENRY DISSTON & SONS,

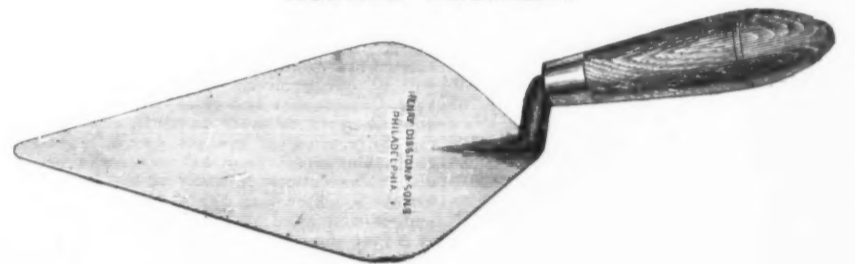


KEYSTONE SAW, TOOL, STEEL AND FILE WORKS, PHILADELPHIA, PA.

PHILADELPHIA PATTERN.



LONDON PATTERN.



BOSTON PATTERN.



We desire to call the attention of the
Trade to the Superior Quality of
our manufacture of

**BRICK,
POINTING,
PLASTERING,
GARDEN**

AND ALL OTHER SHAPES AND
STYLES OF

**SOLID SHANK
TROWELS.**

Our Brick Trowels are made by a new process, which makes them a true taper from heel to point, giving them a spring and elasticity which none others possess. The handles are all made from white gum wood, which is more durable and less liable to split than any other wood, and with confidence we guarantee them to be the Best Trowels in the Market.

CUCUMBER PATTERN.



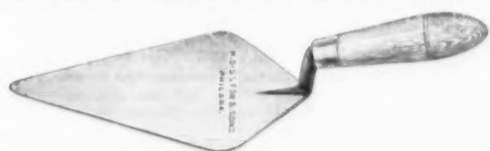
LOWELL PATTERN.



POINTING TROWELS.



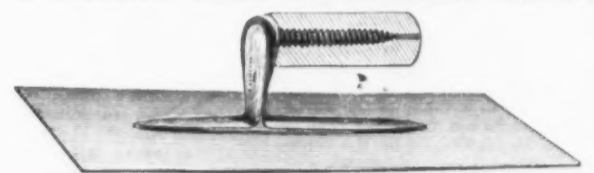
POINTING TROWELS, SOLID SHANK.



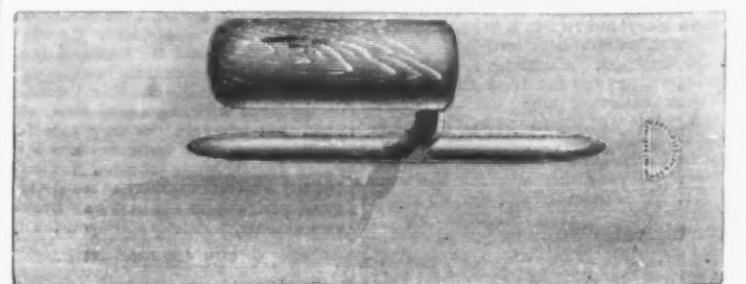
BRICKLAYERS' POINTING TROWELS.



No. 1 PATENT TANG PLASTERING TROWELS.



No. 2 PLASTERING TROWELS.



We also Make a Full Line of the Above Goods in the Keystone Quality; Samples of
Either will be Furnished on Application.

The Manufacture of Iron and Compound Armor Plates.

The agitation in behalf of the establishment in the United States of works capable of turning out the material for offensive and defensive warfare gives special interest to an elaborate description by a Russian naval officer, J. Brink, of the methods employed at the works of Charles Cammell & Co. and John Brown & Co. in the manufacture of iron and compound armor plates. That description has been translated for *Stahl und Eisen* by L. K. Kuzmany, of Pola, whose account we follow:

Compound armor plates consist of an iron plate manufactured and rolled separately, and a steel plate welded to it. The work of making compound plates may therefore be divided into three operations—1, the manufacture of the wrought-iron plate; 2, the making of the pile of the iron and steel plates or the welding together of the two, and, 3, the rolling of the pile into the needed lengths and the further operation of bending them. The first operation may be divided into two parts, the manufacture of the raw material for the iron plate and the welding and rolling of the iron pile. Simple iron armor plates are made in the same way as those which are a component part of compound plates, so that everything that is said in regard to the latter, so far as it refers to iron, is applicable to the ordinary iron plates.

IRON ARMOR PLATES.

The Preparation of the Raw Material for the Armor Plates.—At the Cyclops and at the Atlas works the wrought iron is puddled from a mixture of two parts of gray and one part of white iron or refined plate iron. The gray pig is obtained by the Cammell's from Madely Wood, Barbers Field, Wednesbury Oak, Lilleshall and other furnaces. The white pig or refined plate iron is made by the firm itself from gray pig, by remelting and adding scrap. The percentages of the pig and scrap used are not uniform, being dependent upon the composition of the iron. Sometimes as much as one-half is scrap, occasionally only one-eighth. The balls obtained in puddling are very carefully hammered down to a bloom and are at once rolled out without previous heating to "puddled bars" about 1 inch thick. After cooling, these puddled bars are cut into strips, of which 12 to 18 are put together into small piles. The latter are well heated, carefully hammered and are rolled out without further heating to bars 1 inch thick. They are called ball-furnace bars. The material thus prepared is used for making plates not thicker than 10 inches, because in that case the pile for making it can be three times as thick as the finished plate, and the material used for it is once more thoroughly worked in rolling it. For thicker armor plates the process described of making ball-furnace bars is repeated, so that twice the work has been put into the iron used for the piles of thicker plates.

The Iron Armor-Plate Piles.—The piles for the armor plates consist of a number of plates which are laid direct upon each other. These plates are 3 inches thick, and they are made out of the 1-inch bars and the strips from which they are cut. The height and length of the pile for the pile plates depend upon the dimensions of the armor plate. After the pile has been well heated it is put through the rolls, first lengthwise two or three times, then sideways three or four times. In the first and second passes as great a pressure as possible is exerted. Then rolling lengthwise is again resorted to, the pressure being such that, with the smallest possible number of passes, the length is increased to 5.82 to 6.75 feet. Finally the pile is rolled sideways until the plate is from 5.82 to 6.75 feet broad. It will be noted, therefore, that the pile is worked much more sideways, or from 1.22 feet width to 5.82 to 6.75 feet width, while lengthways it is stretched from 3.91 to 5 feet to 5.82 to 6.75 feet. The pile plates thus rolled are trimmed so that the width is equal to the width of the armor plate to be manufactured. The height and length of the armor-plate pile are so chosen that two plates can be made from it. For armor plate of medium thickness the length of the pile is about 14.5 feet, for thick plates about 11.7 feet. The height of the pile is so arranged that it bears the ratio of 3 to 3½ to 1 to the thickness of the armor plate to be made. This ratio cannot be adhered to in the case of thick armor plates, because the rolls would have to be lifted too high to put the thick piles through. In this case iron which has been worked twice is employed. The plates used in the pile are rolled from smaller piles, or ordinary pile plates are welded together in bundles of two or three. The armor-plate pile is then made up from such plates by making the pile 1½ times as thick as the required thickness of the armor plate. In any case the proportion between the aggregate thickness of the furnace bars used and of the final thickness of the armor plate must remain the same. This is one of the principal conditions which must be carried out in making piles for armor plates if a good article is to be secured.

Sometimes the method described is deviated from. It is a difficult matter to specify the cases in which this is done. It can be stated in a general way that only excellent material is employed in making the plates, and that every device is used by which thorough welding can be secured. In Sheffield special attention is given to making the piles and to working them thoroughly in all directions.

The pile built up in the manner described is carried up to a welding heat and is rolled down to the thickness called for. When the pile is particularly thick one heat does not suffice, and after passing through the rolls several times the pile is again put into the furnace and rolled down.

After rolling, the plates are always straightened or bent to specification under a press before they are allowed to cool. It is only when the bending is a complicated one that the plates are either heated over an open coal fire as at the Cammell Works, or in special furnaces at Brown's. The process of making armor plate described above is substantially the same at both the Cammell and the Brown works.

Although the day of iron armor plates has passed, a thorough knowledge of their man-

ufacture has even greater interest now than formerly, because they are needed in making compound plates. It will be appropriate, therefore, to compare the different methods of manufacture, with special reference to those in Russia, to add some general remarks, and to note the points in regard to the chemical composition of the iron used in their manufacture.

At the Kolpino Iron Works, in Russia, the puddled bars are made up into piles in the same way as in England, their height being, however, only half as great. After the pile has been carried up to a welding heat it is rolled, without previous hammering, into bars about 6 inches wide and .78 inch thick, the form in section being that shown in Fig. 1. This material, which has therefore been worked once, is employed in building up the pile for the plate. First a bottom plate from .177 to .236 inch thick is laid down, and upon it are placed the bars having the section illustrated, in such a manner that they fit as closely as possible. The second layer, as shown



Fig. 1.

in Fig. 2, is placed upon the first at right angles to it, then the third, and so on until the height of the pile is reached. With the bottom plate and a like top plate the height of the pile ranges between 18.9 and 19.95 inches. The pile is heated and rolled down to the thickness required. From the detailed statements furnished by official reports in the manufacture of iron armor plates it may be noted that, for an 8.66-inch plate, piles from 17.7 to 20.86 thick are used; for 6-inch plates they are 17 to 17.76 inches high, and for 12-inch armor plates, 17.75 to 19.3 inches high. For all of them the raw material is bars having the section shown. The reason why the piles for plates of different thickness are substantially equal in height is the out-

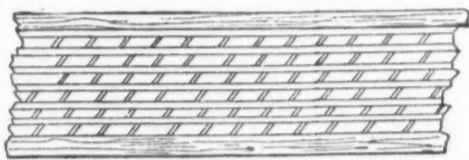


Fig. 2.

growth of the idea, expressed in the reports alluded to, that the metal for thin armor plates needs more perfect working than the material for plates from 11 to 13.78 inches thick. According to the opinion held by the manager of the Kolpino Works, the latter should not be so dense, but should to some extent be "loose." Exactly what "loose" iron is, and whether that property does not conflict with other desirable attributes of good iron, need not be discussed. It is certain, however, that the effort to make "loose" thick armor plates was the

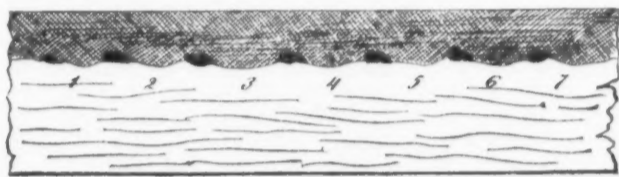


Fig. 3.

cause of the inferior quality of Russian plates, as compared with those made in England. Such a system of building up the piles does not admit of expelling the cinder and thoroughly working the iron, and is the

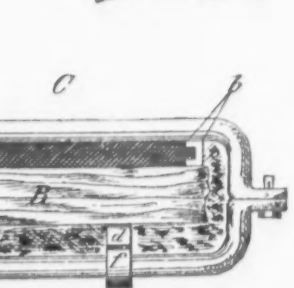
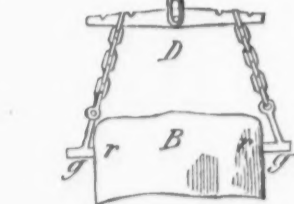
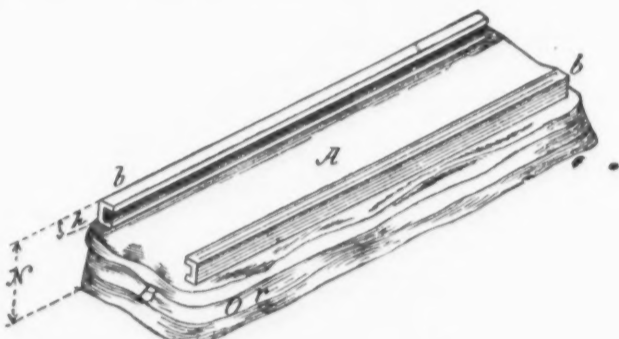


Fig. 4.

The Manufacture of Iron and Compound Armor Plates.

reason not only for the variations in quality between plates made from the same sized piles, in the same manner and from the same raw material, but for the fluctuations in the resistance to percussion of different parts of the same armor plate.

The mechanical tests of English plates show that the quality of the material is as good with thick plates as it is with thin ones, proving that the metal has been very thoroughly worked in every case, the average

tensile strength being 41,244 pounds. It cannot be assumed that a plate which yields good results, so far as tensile strength and ductility are concerned, should give poor results when fired at, provided the material of the plate has been uniformly well worked.

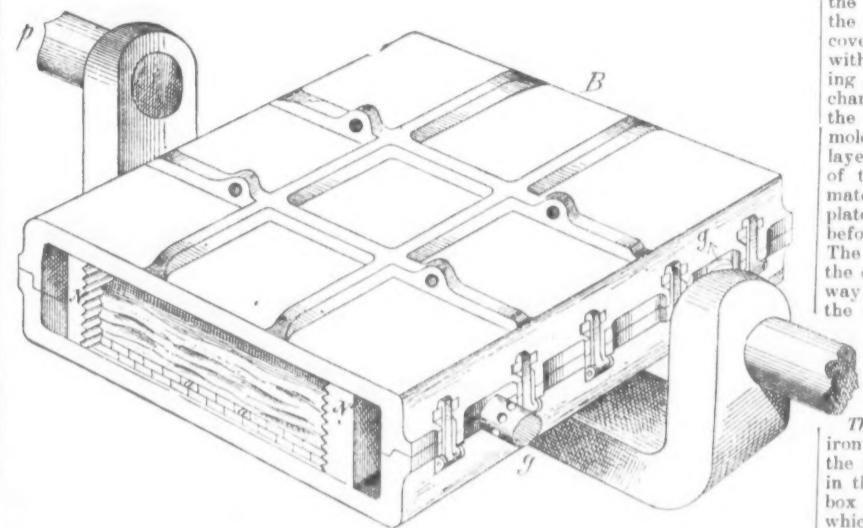


Fig. 5.

The mechanical properties of iron depend largely upon the work put into it and its chemical composition. It is not every grade of iron that welds well, and it does not follow that pure, good iron would act well under a system of working like that followed in making armor plates in England.

Unless special means are resorted to, iron containing a good deal of silicon, phosphorus and manganese is purified more readily of cinder than iron which contains only a small quantity of these impurities. Such iron, it is true, welds more easily and completely, but an armor plate made from it would resist projectiles less and be more brittle than other grades of iron lower in silicon, phosphorus and manganese. Therefore that iron is most suitable for making armor plates which is not too high nor too low in these substances.

English manufacturers have been at great pains to ascertain the best grade of iron for the manufacture of armor plate. The following analyses of armor-plate iron made in England have some interest:

	I.	II.	III.
Carbon.....	.04	.07	.06
Silicon.....	.117	.2	.15
Manganese.....	.09	.1	.21
Phosphorus.....	.165	.17	.23
Sulphur.....	.01	trace	..

iron and compound armor plates have proven that the day of iron plates is past, and that a more perfect armor must be sought for to protect ships against modern guns. The Creusot steel plates proved superior to the English iron plates, but even they did not

aid of the sling D the plate is lifted by a crane and put into the cast-iron box C in an almost vertical position, so that the channels b fit closely to the inner surface of the box. This is accomplished by means of wedges d d. Any open space is then filled up with dry molding sand. The space between the surface of the iron plate and the inner surface of the casting box and the bottom of the latter, which is always covered with a layer of brick, is filled with steel. In order to prevent the leaking of the latter, the cracks between the channels and the iron plate and those of the bottom are filled with wet clay and molding sand in the following manner: A layer of moist clay is spread over the bottom of the casting-box, and balls of the same material are placed along the seams of the plate after it has been hung into position, but before the molding sand is rammed around it. The latter operation forces the clay into all the cracks. If any fluid steel should find its way into the cracks, it chills in contact with the wet clay. It is in this manner that the

pile for the compound plates is obtained, the method described being usual at the works of Cammell & Co. from 1879 to May, 1882, when the following method was adopted:

The New Method at Cammell's.—The iron plate, hot as it is when it comes from the rolls, is placed upon the brick base a a, in the box B, Fig. 5, which is similar to the box C in Fig. 4. It is fastened to a frame which can be swung on the horizontal axis p p. The box is kept in a horizontal position only temporarily, in order to run the iron plate in more conveniently. The brick base is made so thick that the space between the iron plate resting upon it and the inner surface of the box is equal to the thickness which the steel plate is intended to have. The width of the brick base is, however, somewhat less than the width of the iron plate. As soon as the latter has got into place the cheeks N N are forced against its sides by means of the screws g g, making its sharp teeth bite into the sides of the plate. The box is then placed into a nearly vertical position, all open spaces are rammed full of dry molding sand or clay and everything is ready for running in the steel. This method, which is better and cheaper than the first, has its drawbacks, however. To a greater or less extent steel is cast over the edges of the iron, and this excess must be removed before putting the compound plate into the reheating furnace. This is hard work for the men and cannot be done without subjecting the plate to shocks and a lowering of temperature. This leads to the formation of cracks chiefly at the edges of the steel, which are further enlarged during the rolling, so that they often reach within the limits to which the plate is afterward cut.

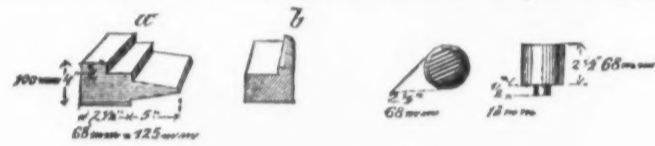


Fig. 6.

it may happen that this scale is partly melted, and, as it is lighter than the steel, it will reach the surface under ordinarily favorable circumstances. It may be assumed, too, that a part of the scale causes the formation of carbonic oxide, forming blow-holes within the steel. The agitation in the steel caused by the pouring would tend to aid this reaction, since it facilitates the mixture of the oxide and the liquid steel.

The temperature of the steel is so high that it not only washes down the scale from the iron plate, but also causes the latter to melt at the places where it flows down on it. Fractures of compound plates from that part which occupies the top part of the mold show plain traces of this action, gutters being formed as shown at the points 1, 2, 3, 4, 5, 6 and 7 in Fig. 3. It should be noted that it is especially in these gutters that the welding or uniting of the iron and steel is most perfect, and that it is impossible to detect there the slightest indications of blow-holes, which are found at other points. They are not large, however, though there appears to be some uniformity in their distribution.

The methods of manufacture vary at the different English works, so far as the preparation of the iron plate is concerned.

The Old Method at Cammell's.—Two channels b b, Fig. 4, having the form shown are attached to the top of an iron plate by means of bolts. Then a hole, r, 5 inches deep and 4 inches in diameter, is drilled into the thickness of the plate as near the end B as possible. These holes are drilled in order to facilitate the handling of the plate, and are located at the end B, because it stands uppermost in the casting frame C when the steel is being poured. The iron plate thus prepared is placed on the removable hearth of a reheating furnace. The steel shapes b are covered with brick and clay, and the holes r are filled up. The bottom is then run into the furnace and the plate reheated. When brought up to a welding heat the iron plate is taken out in the bottom, the covering is stripped from b, the bearings g g are inserted into the holes r, and with the

Small cracks in different parts of the plate are not necessarily serious, but they are certainly not desirable and should not happen with a well-developed process of manufacture.

The Method of John Brown & Co.—Their iron plate is prepared for the steel casting in the following manner: Bars having the section shown in our engraving are attached to the plate A at their edges by means of screws. The longitudinal bars a a, Fig. 6, are made of steel, while the short bar b is made of iron. A steel top plate, B, 2 to 2.25 inches thick, is screwed to this frame. Some room is always left between the top plate and the cross-bar b in order to let the cinder flow off. The top plate is only firmly attached to the bars a a. In order to keep the steel top plate at the desired distance from the iron plate during the process of preheating a number of steel studs are so inserted into the iron plate that their larger tops support the steel plate. In order to prevent the burning of the edges the parts made of steel are covered with clay, and the openings through which the steel is to be cast is filled with brick and luted. Then the plate is put into an ordinary heating furnace in order to preheat it previous to casting in the steel. When heated to near a welding temperature the plate is taken out of the furnace, stripped of the clay coating of some of its parts, and is carried to the locality where the steel is to be cast into it. There it is pushed between two cast iron plates, C and D, in such a manner that the steel top plate rests against the upper cast-iron plate D. The cast-iron plate C is pressed against the plate A by means of screws, everything is luted, and open spaces are rammed full of molding sand. The steel cast into this mold must unite with two large surfaces—with the iron plate and the steel top plate. It is assumed that the steel studs, which are made of the hardest crucible steel, specially for this purpose, get near the melting point during the preheating, and fuse completely when the steel is cast around them.

(To be continued.)

COMPOUND ARMOR PLATES.

The trials made in 1876 at Spezia with

used in the years 1879, 1880 and 1881 at Kolpino, Russia, in making armor plate:

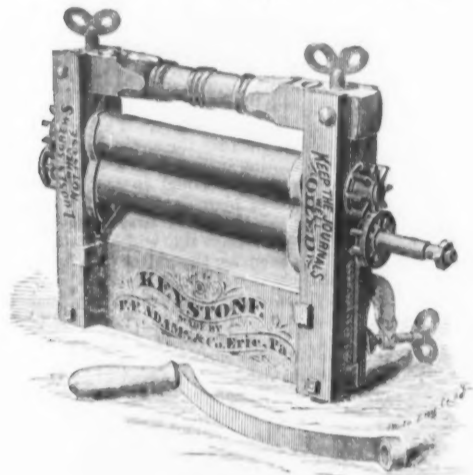
	I.	II.	III.
Carbon.....	.09	.06	.06
Silicon.....	.12	.2	.15
Manganese.....	.09	.17	.09
Phosphorus.....	.12	.36	.04
Sulphur.....	.02	.098	trace
Arsenic.....	.106	.05	trace
Copper.....	.02	..	.07

THE F. F. ADAMS COMPANY OF ERIE, PA.,

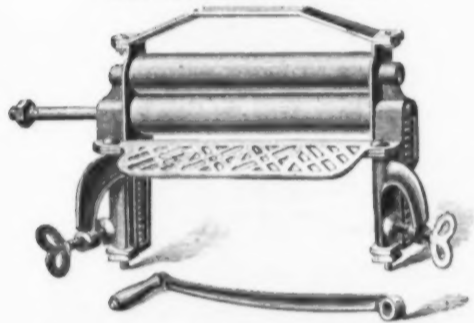
Patent Household Articles.

SEND FOR ILLUSTRATED
CATALOGUE OF 1885.

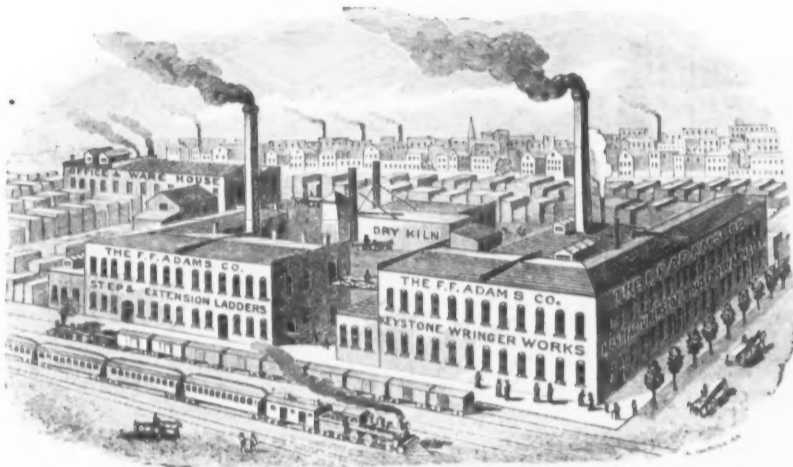
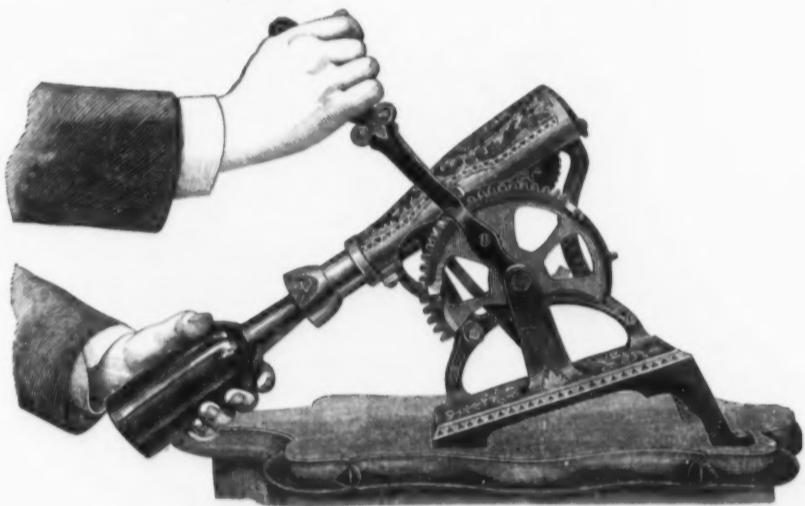
The Celebrated Keystone Wringer.



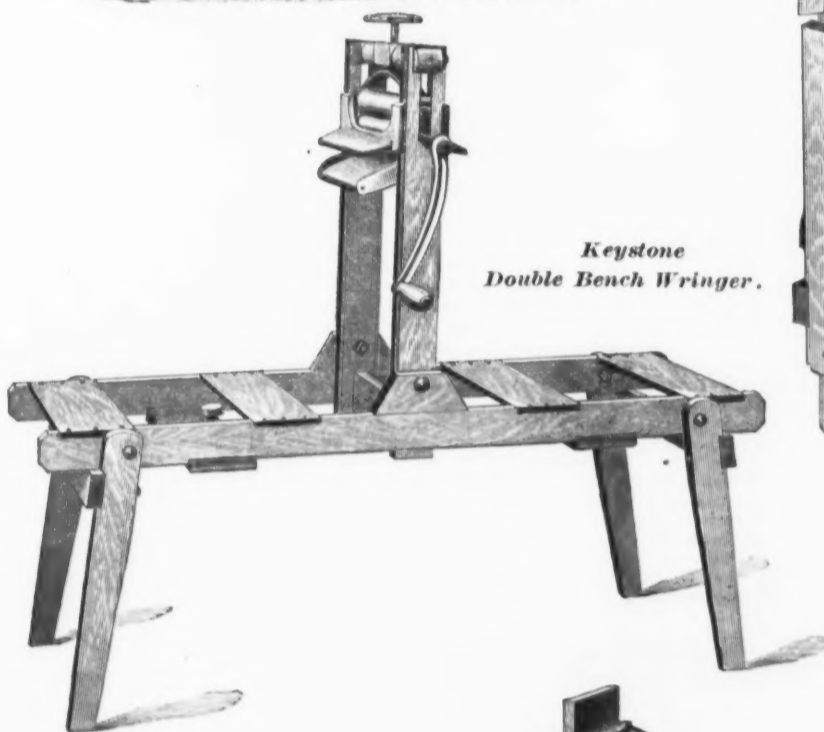
Our New Style No. 11.



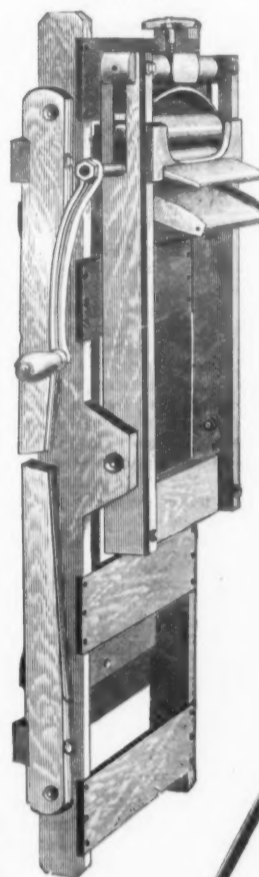
Adams Patent Machine for Drawing Corks.



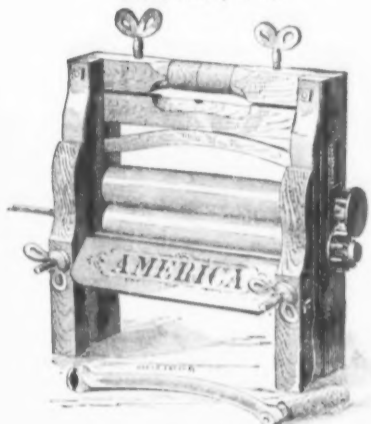
*Keystone
Double Bench Wringer.*



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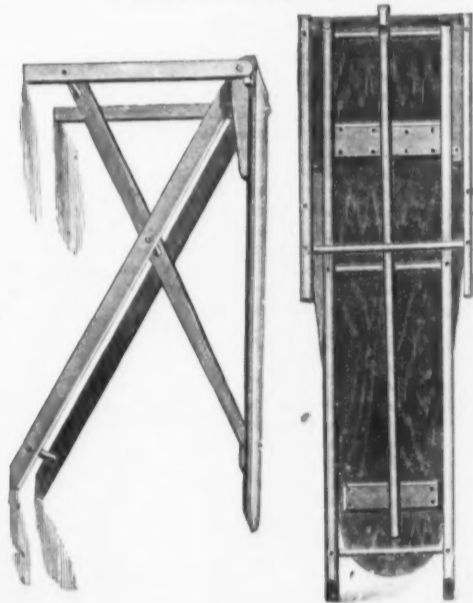
*The America Wringer.
No. 8, Family Size.*



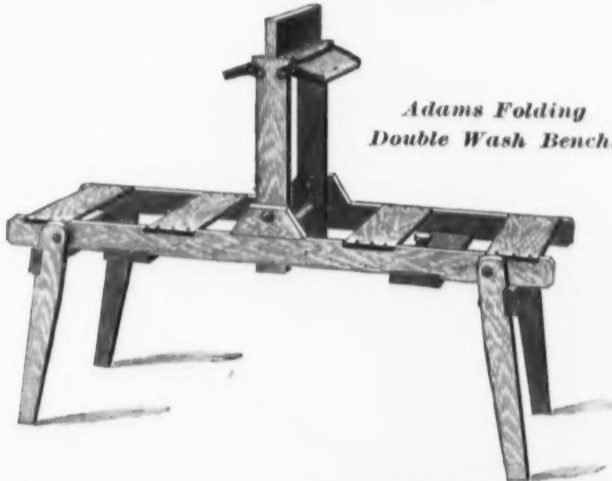
Duplex No. 2 Swing.



Adams Ironing Table.



*Adams Folding
Double Wash Bench.*



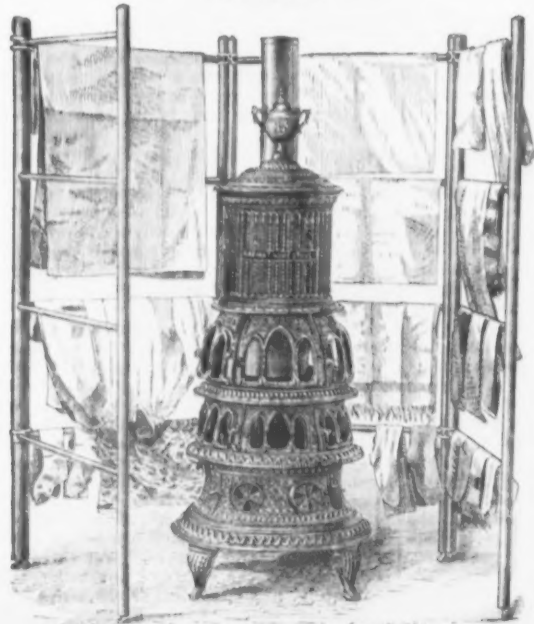
*Lovell's Patent Extension Ladder
Patented October 22, 1867, and August 4, 1874.*



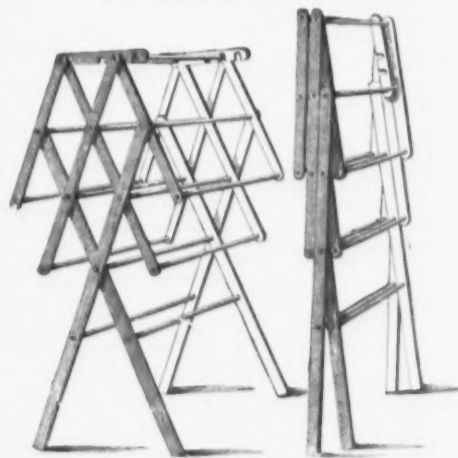
*Adams Safety Step Ladder.
PATENTED Feb. 3, 1885.*



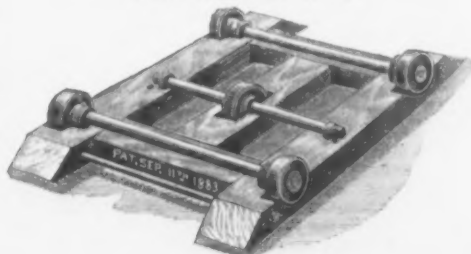
*Reversible Clothes Horse.
PATENTED.*



Excelsior Clothes Horse.



*The Adams Iron-Wheel Truck.
PATENTED SEPT. 11, 1881.*



THE WEEK.

California exports for the last three months equal a little over \$12,000,000, against \$9,000,000 for the same time in 1884, an increase of about 33 1/2 per cent. The imports are also increasing, showing that the large exports are beginning to be felt in increased purchases abroad, and an early start in the home trade is confidently looked for, as the exchanges are already beginning to surpass those of 1884, and there are probably 750,000 tons of wheat yet in the State.

The English budget for 1885, submitted by Chancellor Childers, shows a deficit for the ensuing financial year of nearly £15,000,000, the largest since the Crimean war. The income tax of the past year produced £12,000,000, exceeding the estimate by £750,000. The total receipts from taxation were £14,247,000, and the total revenue £88,043,000, and the total expenditures were £89,092,000. Mr. Childers estimated that the outlay for 1885-86, not including the vote of credit, would be £88,872,000. With the income tax at 5 pence in the pound sterling the total revenue would be £85,180,000. The deficit Mr. Childers estimated at £3,732,000, and, adding the vote of credit, together with reasonable allowances for supplementary estimates, the total deficit was estimated at £4,932,000. Mr. Childers proposed that the duty on foreign stocks made payable to bearer be raised to 10/ per cent; that the duty on home-made and foreign-manufactured spirits be raised by 2/ a gallon, and the duty on beer 1/ a barrel. The foregoing additional taxation will produce £7,500,000, leaving a deficit of £7,432,000, which it is proposed to meet by taking £4,000,000 of the sum annually devoted to the reduction of the national debt, leaving the balance to be met by the operation of the sinking fund.

A contract for building an iron pier 1200 feet in length, at a cost of \$60,000, at Atlantic City, has been awarded to the Phoenix Iron Company, of Phoenixville, Pa.

The railroad commissioners of this State call the attention of the Legislature to an important bill recommended by them, which forbids railway companies to allow any rebate or advantage for the shipment of freight over their roads, conditional on a promise not to ship over any canal owned by the State.

Pittsburgh papers rejoice in natural gas, which one of the editors says is imparting to the city a second growth. This gas, we are told, is very largely introduced into industrial establishments, and is a pronounced success economically and as regards the increased excellence of the products of the furnaces in which it is used. As an illustration of the economy it is stated that slack for steam-making was until recently supplied at 56 cents a ton at the mills, yet, cheap as this was, gas has supplanted it at a saving in fuel and labor of considerably more than 50 per cent.

The "building boom" in San Francisco this season is declared to be without precedent.

The new duties imposed by the Government of Buenos Ayres are equivalent to an advance of 15 per cent. to cover the expected deficit resulting from a depreciated currency. The rate is \$16 per ton on wheat and 22 cents per gallon on kerosene.

The leading firms in the glucose business have issued a circular in which they say that about \$10,000,000 of capital is invested in their business in the United States; it employs 4575 workmen, who are yearly paid \$2,058,750 in wages; consumes \$13,703,000 worth of raw and manufactured material yearly, and in the same time yields a product worth \$18,270,000. Each year there can be made about 610,000,000 pounds of corn sugar and 61,000 bushels of corn used daily, each bushel giving 32 pounds of glucose. The glucose sugar can be made with profit, it is said, at 2 cents a pound.

The Minnesota Iron Company now have 65,000 tons of ore mined, and will have 90,000 tons by the opening of navigation. The company will mine and ship 240,000 tons this year if the market justifies. All the ore shipped to Cleveland last year has been sold, and three or four furnaces are now running ore from the lower mines. The Duluth and Iron Range Road will haul 50,000 tons of ore a month from the mines to Two Harbors.

At the opening of the new Cotton Exchange last Thursday Hon. Abram S. Hewitt spoke of the high commercial advantages of this port. Our harbor is kept open by a most remarkable combination of water currents, and, in spite of all the efforts of the authorities to close it, keeps a depth of 20 feet of water over the bar. Within a year it would be found that by a slight expenditure 30 feet of water may be maintained, giving entrance to the largest ships of the world. Our people, the speaker said, are proud of commerce. Commerce is not gambling, but a fair exchange of values, to the profit of both parties. Commerce began here as upon the Rialto, and as it seems to have begun everywhere, by merchants meeting on a bridge. It was on a bridge in Broad street that the merchants first met and established their Friday's market, and there was an old ordinance which enacted that the boys should refrain from sledding on Exchange Hill on Fridays, in order not to disturb the business of the merchants. It was a curious fact that all the first exchanges were intended to bring business men of all kinds together, but New York had outgrown institutions of that description, and its affairs have become so differentiated that seven or eight powerful organizations are now devoted each to its special branch of trade. No other city in the world was thus so largely differentiated. The speaker dwelt upon the advantages of commercial freedom, and charged the Government with having busied itself for years in creating ob-

structions, placing its police at every port, following men everywhere, and levying toll on every business transaction. When commercial freedom comes back to New York it will become the center of the commercial world. He believed the right of free exchange with other countries can be secured without injury to society, and that the slavery in which commerce was bound could be abolished with no more harmful consequences than the abolition of negro slavery had upon the production of cotton.

The five swift ocean steamers Alaska, Arizona, Oregon, Umbria and America, recently chartered by the British Government, were taken at the average rate of near \$20,000 per month. The coal capacity of the Alaska is estimated at about 4000 tons, and, as her consumption is 253 tons a day, this would last her about 15 days, or enough to make a voyage of over 6000 miles. The Oregon burns 337 tons a day, the Umbria about 300 and the America 182 tons.

Claims which appear extravagant are made in behalf of the future of the Copper Belt Mining Company, of which Gen. G. B. McClellan is the president. The mines are located in Central Texas, and it is asserted that copper can be laid down in New York at a cost of 6 cents. The future will probably tone down these glowing estimates, and what can be done will probably be ascertained at no distant date, since the company has contracted with a San Francisco foundry for the construction of two water-jacket furnaces.

London merchants urge that the River Clyde should be more thoroughly defended.

The wonderful tin mines of Harney Peak, Dakota, have not yet upset our local markets by a flood of American tin. While there seems to be little doubt that there is tinstone there in paying quantities, the production is not got out with the rush which ardent promoters would like the public to believe. It is one thing to promise tons of metal a day, and quite another thing to do it. Assuming that the tinstone carries 2 per cent. of metal, an output of 1000 tons per annum would call for the crushing of 50,000 tons a year. In a locality remote from railroads it takes time to provide the machinery for such an amount of work, and the owners of the deposits have not yet even made up their minds what to order and from whom. We question, therefore, whether Dakota tin will appear in our markets in any quantity worthy of notice in the year 1885. As for the wild and extravagant statements that we are to be made independent of foreign supplies at an early date, they are simply absurd. We use about 12,000 tons per annum. It would take years to get mines, if they could stand the strain, and plant into shape for such a quantity.

The State Senate of Michigan has passed a bill providing for the establishment of a mining school, the plan, so far as revealed, being somewhat ambitious in its character. Fifteen thousand dollars have been appropriated for 1885 and \$10,000 for 1886. Tuition is to be free to all bona fide residents of the State. Details are to be worked out by a board of six members, residents of the Upper Peninsula, who are to hold their first meeting on the 15th of July at Houghton.

There is further evidence that the French bounty system was a mistake. If not this, it is at least proven that the liberal premium set by the French Government upon ship-building is insufficient to protect this industry under the present depression. The Chargeurs Réunis Company, in place of 15 per cent. dividends as in 1882, and 12 1/2 per cent. in 1883, due to the shipping bounties, was unable to pay anything in 1884. British workmen who recently visited French shipyards report that the present position in England is superior to that of France.

The Michigan papers are making a vigorous attack on the smelting charges for working mineral. They are certainly excessive, and are burdensome particularly to the smaller mines. The larger concerns are interested in the Detroit and Hancock works, so that with them it is simply transferring money from one pocket to the other.

The attention being given by English merchants to African trade appears from the single fact that there are 82 steamships that touch regularly at Funchal while passing to and from the African coast and islands adjoining, and nearly all are owned in Great Britain. The two principal companies restrict their operations to the line of coast between Sierra Leone on the north and Loando and the mouth of the Congo on the south. At intermediate points there are facilities for receiving and storing freights, small steamers to penetrate rivers and inlets, with surf-boats, local agents, &c. The business is supposed to be at least moderately remunerative.

The American consul in Palestine believes that American hardware of all kinds, stoves, tools, cutlery and cooking utensils, would find a ready sale in Jerusalem, providing the cost of getting such goods to that market did not effectually prevent their being imported. Already the sacred places are lighted with petroleum from the United States.

It is claimed by the officers of a German frigate lately lying at Funchal, on her way home from the African coast, where she had been to secure new possessions, that the area of territory in the new acquisition bordering on the Gulf of Guinea is twice the area of the German Empire in Europe.

Consul Baker, at Buenos Ayres, makes various useful suggestions in reference to agricultural machinery. As compared with European manufacturers in this line Americans are at a disadvantage, in the absence of credit accommodation and direct steam communication. There are no American branch houses for the sale of these goods, but there are several old and established houses which give orders on their own account. English manufacturers generally give a six months' credit, but in the United States there is little

or no credit given, the goods being paid for in New York on their shipment or when they are put in the custom house at Buenos Ayres. Despite the difficulties referred to, the preference for American goods is very decided.

The Argentine tariff for 1885 lays a duty on all agricultural implements, plows, reapers and separators, wire fencing, iron pieces for repairing machinery, &c., of 5 per cent. on the valuation. In the case of most articles the duty is assessed on the value declared in the custom house. In the case of plows, however, the official value varies from \$4 to \$10.50 each, according to the article. On all wooden handles, &c., the official value is from \$1.50 to \$6 per dozen, according to size and finish.

Insurance agents at this port say that war rumors thus far have had no influence in advancing marine risks.

The Isthmus of Panama is again in control of the Government and business is everywhere resumed.

A dozen loaded coal barges belonging to the Delaware, Lackawanna and Western Railroad Company were sunk in the river near Sing Sing.

The Commissioner of Railroads has received an attested copy of the lease made by the Southern Pacific Railroad Company and the Central Pacific Railway Company to the Southern Pacific Company of Kentucky.

Consul Ballou speaks encouragingly of any efforts which may be put forth for the extension of American trade in Southern Germany. He says unhesitatingly that a good field now exists in Southern Germany for the introduction of many articles manufactured in the United States, and "all it wants is to be developed and to have the same attention given to it that it receives at home." Alsace is mentioned as offering special inducements. Manufacturers may retain their agencies at the seaports if desired, but salesmen should be dispatched to introduce specialties and afterward visit the ground at regular intervals.

The new Korean hospital at Seoul is in charge of Dr. H. N. Allen, an American citizen.

The Secretary of the Treasury has directed the suspension of the following named assistant appraisers at New York: Merritt Wickham, William H. Gregg and Ward S. Fowler.

Agents of the Transatlantic passenger lines are expecting that travel the coming season will be much lighter than usual.

Anthony M. Keily, originally designated for Italy, has been appointed United States Minister to Austria-Hungary.

At a meeting in San Francisco last week Gen. John Hewston read a paper describing an electrical invention by John C. Ludwig, of that city, the special object of which is to produce strong and efficient currents while obviating the necessity for maintaining large batteries and power-driven, mechanical generators. A small bichromate-of-potassium cell induces a current sufficient to overcome the resistance of over 5000 miles of No. 10 galvanized-iron wire. It is claimed that this invention will mark a new era in telegraphy, doing away as it does with the huge batteries and dynamo machines now in use, and thus effecting a saving, as estimated, of \$1,000,000 annually in this country alone.

The Jackson Architectural Iron Works have executed their contract for the fire-proof building of the Eagle Fire Insurance Company, at the junction of Wall street with Pearl and Beaver. The beams, roof and staircases are all of iron. The same establishment will put a fire-proof mansard roof on the building for Isidor Cohnfeld in course of erection on Greene and Bleecker streets.

A gang of striking stone-cutters were surrounded by the State militia near Singer Quarry, Ill., and 70 of their number captured. In a subsequent collision two men were killed.

Two horizontal tubular boilers in the Tremont Hotel, Galveston, exploded on the 3d inst., with fatal effects. They were made in St. Louis and were nearly new.

A bill in the New York Legislature incorporating a great company to supply villages along the Hudson with water from the Adirondacks is said to contain "a tremendous scheme."

Within five years the New York Elevated Railroad's traffic has increased over 100 per cent., and the net earnings are about \$2,000,000 per annum.

Chicago papers record several instances of paralysis caused by inhaling the poisonous fumes of bisulphide of carbon.

Engineering in China has achieved a notable triumph in the bridge at Lagang, over an arm of the China Sea. This structure is 5 miles long, built entirely of stone, has 300 arches 70 feet high, the roadway is 70 feet wide, and the pillars are 75 feet apart.

A bill has been favorably reported in the Pennsylvania Legislature imposing a tax of 5 mills on the interest of deposits in savings banks having no capital stock. It should be entitled a bill to discourage the industrial classes in hoarding their resources.

To be able to properly temper steel springs and implements may be considered a gift similar to that possessed by the "poet born." A man whose business in a certain tool-shop was to temper springs worked 22,000 consecutively, and of the whole number only six failed to pass the test; but during his temporary illness more than half the springs handled by his assistant, who had been under instruction a year, failed. In a large manufactory of sword blades one man does all the tempering, being called in from other employment at intervals, because, although he has always been willing to instruct others, he has never had a pupil who could equal

him in the work. There is a large scythe manufactory in a New England town making 15,000 dozen scythes a year, and the president of the company has for years hardened and tempered every scythe that leaves the works, because no other man in the works can do it so well.

Brick manufacturers on the Hudson River have received a large number of orders, and business prospects are encouraging.

Different views are held with regard to the relative efficiency of the agents most suitable for cleansing such apparatus as hand portable pumps, and opinions seem to be equally divided between steam and alkaline solutions. Herr Kohlmann has put the matter to a thorough test. His experiments show that the steam process does not always sufficiently perform the work required, but that very good results were uniformly obtained with a cold 2 per cent. solution of caustic soda.

John J. Boyle, who sailed from Philadelphia last week, has a contract with the Spanish Government to attempt the recovery of "untold millions" of treasure sunk in Vigo Bay since 1792.

The production of manufactured iron in France during the latter half of 1884 was 455,977 tons, being a decrease of 17,133 tons on the quantity produced during the second half of 1883.

Triple compound engines have given such high economical results that the British Government are now building a war ship which is to be fitted with engines of that compound type.

The Pennsylvania Railroad Company is said to be negotiating for the purchase of the American Dock and Warehouse Company's property at Tompkinsville, S. I., valued at \$1,000,000—supposed to be wanted for a coal depot.

William Woodward's steam yacht Wanda was launched from Piegrass & Pine's yard, in Brooklyn, on Saturday. The Wanda is a steel-built yacht, 143 feet long over all, 18 feet wide, 11 1/2 feet deep, and upon to feet 6 inches of water will displace 190 tons. J. W. Sullivan, of this city, will furnish the two 60-horse-power compound inverted tandem condensing engines that will furnish her motive-power. One of the cylinders will be 38 inches and the other 20, with a stroke of 24. The boilers, two in number, are of steel. One is 9 x 6 and the other 6 x 6 feet. The screw is to be 8 feet 6 inches, with a pitch of 14 feet. The builders say the vessel will average 16 or 17 miles an hour. She will cost \$70,000.

The Edison Electric Light Company have begun what may become an extensive litigation in the United States Circuit Court by instituting suits against various companies declared to be infringers upon the Edison patents for incandescent electric lighting, and against a number of the users of the alleged infringements. Among the companies sued are the United States Electric Lighting Company, the United States Illuminating Company and the Consolidated Electric Lighting Company.

The refined product of the Baku oil region in 1884 is estimated at about 108,000,000 gallons, an increase of 80 per cent. over the previous year, nearly all of which was consumed in Russia. The indications are that there will soon be a large surplus for export.

The exports of wheat and corn from Baltimore for the first four months of the present year were 2,400,000 bushels of wheat and 8,425,000 bushels of corn. Of wheat there was a falling off of 1,559,000 bushels, and of corn an increase of 6,277,000, compared with the exports of the first four months of 1884.

The sugar crop of Brazil is seriously threatened by drought.

According to the most recent statistics, the population of Mexico is now 10,000,000, and there are 146 cities, 327 towns and 4180 villages. The value of private real estate, rural, is \$772,000,000; private real estate in cities, \$2,568,036,000; cattle of all kinds belonging to individuals, \$126,000,000; property belonging to the nation, \$240,000,000, the total real estate, not including mines, coasts, bays, lakes, rivers, &c., being \$3,549,000,000. The agricultural products are valued at \$177,451,086, and the industrial products at \$44,000,000.

The steamship Haytien Republic will be dispatched from Boston in a few days to the six principal ports in Hayti, and if trade prospects prove favorable a line will be established.

The Lighthouse Board has approved plans for a compressed gas lighted beacon at Romer's Shoals, New York harbor, for which \$25,000 was appropriated by Congress last session. It will be a skeleton iron structure, 41 feet above low water.

R. B. Shepard, of Pittsburgh, recently patented a composition known as black glass, and a stock company, with \$15,000 capital, has erected a building in which to make it. The principal ingredient is a shale rock which lies above the soft coal vein about Pittsburgh, and the glass is apparently the same as the ordinary glass except that it lacks its translucency.

The following claims of superiority over steam traction are made for electricity as a railway motor: Absence of smoke and cinders; it obviates all danger from explosion; it does away with the necessity for heavy locomotives and tenders, and allows of lighter bridges and tracks; the rails are not worn out so fast, as a perfect rotary motion is communicated to the driving-wheels, and there is no pounding or jumping of the motor. A broken rail or an open drawbridge would break the current, so that the train could not reach the point of danger;

by a proper arrangement of connections it would be impossible for any train to proceed to a section already occupied by another train, and collisions would be impossible.

A London telegram says an agreement has been concluded between the English and Turkish Governments by which the latter will allow vessels of the former to pass through the Dardanelles in the event of a war with Russia.

The New York Legislature will adjourn May 15.

Superintendent Baker, of the State prisons, informed the Legislature on Monday night that he would need \$300,000 in addition to the \$581,341 already appropriated this year for the support of the prisoners. This will only last until the end of the fiscal year, on September 30. Beyond that date further appropriations for the support of the prisoners will be necessary. Last year, under the contract system, the prisoners were not only self-supporting, but they put several thousand dollars in the State Treasury. The labor reformers protested against this arrangement. The Legislature upset the system, and to-day the taxpayer is paying the deficit, which will this year amount to \$700,000.

The trial of Edward A. Boyd and George H. Boyd, two of the members of the glass-importing firm of E. A. Boyd & Sons, ended on Monday in the United States Circuit Court in the conviction of both on a charge of obtaining the admission of goods without payment of duties by means of free permits secured by false representations.

The new Cunard steamer Etruria reached this port on Monday evening. On her way across she covered 448 and 449 miles on two days, but she was not speeded all the way. Her builders assert that she will cross the ocean in six days and seven hours, or in three hours less than the lowest record.

Erection of a Concrete Bridge in One Day.—The firm of Zurlinden & Co., of Aarau, having constructed a canal in connection with their works about two-thirds of a mile in length, were obliged by the town authorities to bridge it in two places. This they did by means of segmental arches of cement concrete, constructed to the designs of Professor Tetmajer, of Zurich. The dimensions of the arches—Proc. Inst. C. E.—are: Span, 39 feet 4 inches; rise, 6 feet 6 1/2 inches; thickness at crown, 1 foot 7 1/2 inches; thickness at abutment, 3 feet 3 1/2 inches; thickness of abutments, 9 feet 10 inches; width of roadway, 13 feet 1 1/2 inches. The foundation of both abutments is on fairly good gravel, at a depth of about 5 feet below the springing. Spandril walls are carried up to the level of the roadway, and surmounted by an iron hand-rail, the space between the spandril walls being filled in with gravel covered with ordinary road metalling. The total weight of the structure between the abutments is 194 tons, or, including a live load of 300 kg. per square meter—61.5 pounds per square foot—211 tons. The first bridge was erected in two days in June, 1884, the two abutments being formed on the first and the arch and spandril walls on the second day. The bridge was brought into use after standing for about two months, and has been in constant service ever since for heavy-wheeled traffic without any sign of settlement or cracking. On the 9th of October the second bridge was completed between 6 a. m. and 6 p. m. by 65 men. The concrete was mixed in accordance with the recommendation of Professor Tetmajer, as follows: The cement and sand were first mixed dry, then the gravel added, water being gradually added during the mixing in such quantities that when the punning of the concrete was completed a thin film of water showed upon the surface. The concrete was mixed as follows:

	Cement vol.	Sand vol.	Gravel vol.	Pounds of cement per cubic yard of concrete
Abutments	1	3	7	337.2
Arch	1	2	4	365.8
Spandril	1	2	6	421.5

The quarterly report of the chief of the Bureau of United States Statistics contains the following statement showing the annual average price per ton of 2240 pounds of imported iron and steel railroad bars in the United States from 1855 to 1884, inclusive:

Years ended June 30.	Iron rails. Average import price per ton.	Steel rails. Average import price per ton.
1855	\$31.32	—
1856	32.74	—
1857	34.57	—
1858	34.44	—
1859	32.50	—
1860	34.36	—
1861	35.03	—
1862	35.89	—
1863	31.63	—
1864	32.9	—
1865	37.57	—
1866	36.64	—
1867	34.46	—
1868	28.54	—
1869	30.73	—
1870	34.56	—
1871	37.90	—
1872	32.41	\$57.18
1873	49.08	64.98
1874	54.26	74.75
1875	35.29	71.36
1876	25.52	59.72
1877	—	50.48
1878	—	48.18
1879	—	25.81
1880	—	32.60
1881	—	36.15
1882	—	33.35
1883	—	32.60
1884	—	31.28

* None imported.

Volume V of the *Locomotive*, recently sent us by the Hartford Steam Boiler Inspection and Insurance Company, of Hartford, Conn., is full of valuable practical information on boilers and steam-plant appliances generally. In view of the well and favorably known character of the company, it is unnecessary to specially commend the book, but for those unacquainted with it superficial inspection alone will suffice to reveal its merits.

The Iron Age

AND
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New York, Thursday, May 7, 1885.

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The Demand of the Amalgamated Association.

As was expected, the Amalgamated Asso-
ciation, at their conference with the manu-
facturers last Friday, demanded the renewal
of the scale at present in force in the iron
mills of the West, and, in addition, the
changes and amendments given in another
place. It is not believed that the demand
for the old scale is final. Should the work-
men's committee become convinced that a
persistence in the demand would lead to a
lockout, it is probable that they will concede
a slight reduction, say 10 per cent., but this
will not be conceded until the last moment,
so that the unsettled condition arising from
the continuance of these discussions will
remain at least until the 1st of June. What
will be done at that time is a matter of con-
jecture. Possibly a 10 per cent. reduction,
which it is believed the Amalgamated Asso-
ciation will offer, would induce some manu-
facturers to accept the scale, but it is hardly
possible that so small a reduction as this will
satisfy the mill owners as a class, and as
they seem to be even more united at the
present time than they were in 1882, before
the long strike, possibly the country will see
a repetition of the strike of that year.

The additional demands of the Amalga-
mated Association, given elsewhere, are in
some respects more important than they
appear at first reading. The first one seems
a very innocent change, but involves an en-
tirely new principle—that is, the formal
recognition by the manufacturers as a body
of the right of interference in the internal
affairs of the mill by committees of the
Amalgamated Association, which has hereto-
fore constantly and persistently been re-
fused. The paragraph reads as follows:

Insert in Memorandum of Agreement: "It is
understood that in mills running on specialties,
separate contracts may be made between the
manufacturers, rollers and heaters and the Exe-
cutive Committee of the district without interfering
with this agreement."

Heretofore the clause in the Memorandum
of Agreement has made it possible for the

manufacturers and workmen in the several
mills running on specialties to make separate
contracts without violation of the agreement.
Now the demand is that a third party shall
come in—that is, the Executive Committee
of the Amalgamated Association of the dis-
trict. Heretofore the only formal recogni-
tion by the manufacturers as a body of the
Amalgamated Association has been in
their yearly conferences. They have never
formally recognized the existence of the
mill committees or of the Executive Com-
mittee of the Amalgamated Association in the
interim between the annual meetings of the
conference committees. They have always
received them and dealt with them under
protest. The Amalgamated Association now
demand that their Executive Committee
shall be formally recognized by the manu-
facturers. The clause also has another object
in view, which is really to prevent the
making of these contracts by mills running
on specialties. Under the terms of this
clause a contract made between the manu-
facturers, rollers and heaters alone without
the Executive Committee would be a viola-
tion of the agreement, and the probability of
making such agreements with the Executive
Committee present, who are responsible not
only to the mills in which the contract is to
be made, but to the whole district, is very
much decreased. This clause, then, marks
an entirely new departure in the principle
of regulating wages, and the abandonment
of a principle that has been recognized in
the scales for many years.

A second important change in methods
which these additions to the scale endeavor
to bring about, and which probably, if it is
agreed to, marks the beginning of a new era,
is the demand that the price for making steel
nails shall be 20 per cent. above the price
paid for making iron nails. For some years,
indeed ever since steel began to be worked
in iron mills in any quantity, the conference
committees have recognized in their agree-
ment the principle that iron prices shall be
paid for working soft steel in iron mills when
the output of steel is the same as of iron.
Every rolling-mill man knows that the usual
output of soft steel is greater than the out-
put of iron. This is true regarding nails, and
yet the Amalgamated Association demand
that the price shall be greater. If steel was
harder to work than iron, and if the output
of the nail machines when working steel was
less than when working iron, there would be
some ground for the demand; but as the steel
is not so hard to work as the iron, and as
the output of the machines when working
upon steel is at least equal to the output of
iron, if not greater, there is no justification
for the demand, except the possible power
of the Amalgamated Association to enforce it.

The third new principle introduced into
the scale by these demands is that an extra
price should be paid for working old rails.
This is an idea that has frequently been dis-
cussed, but never seriously brought forward
until the present time. It will be remem-
bered that during the depression following
the panic of 1873, when old iron rails were
being introduced into this country from
abroad in such large quantities, as boycotting
had not then been invented, it was pro-
posed to charge an extra price for working
old rails, but this never was put into force
until now, when the Amalgamated Asso-
ciation demand a formal recognition of the
principle that a higher price should be paid
for working old rails than other iron.

It will appear from this that the Amalga-
mated Association have not learned wisdom.
Their plan proposes a continuation of the same
policy that has created dissensions in their
ranks, led to the disintegration of the asso-
ciation and brought about its present weak-
ness. It is a contest with the inevitable, in
which they are sure to be ultimately de-
feated.

Bituminous Coal in Eastern Markets.

Early in February we alluded to the an-
nouncement that a pool had been arranged
between the two principal carriers of bitu-
minous coal to tidewater markets. At that
time these railroads "fixed" the pool price of
Cumberland and Clearfield coals at \$2.70 at
Baltimore, \$2.80 at Philadelphia, \$3.25 at
New York and \$3.50 at Boston, at the same
time agreeing to a percentage distribution
of tonnage. We then questioned the ability
of the two railroads and of the coal pro-
ducers, even if they really desired it, to
maintain these figures. We gave our
grounds for that conviction, the principal
reasons being that until then in the
history of the trade all such attempts
had been failures, and that this year, more
than ever before, the producing capacity of
the old and of new districts, taken together,
was far in excess of the demand unless gen-
eral business revived in an unexpected
manner. We alluded to the probability of lower
prices for anthracite, which would compel
corresponding reductions in soft coal if the
trade captured in 1884 was to be retained.
The fact, too, was pointed out that there is
nothing ruinous either to the operator or to
the carrier in good soft coal at \$2.50 in New
York or \$2.75 in Boston. That statement
we adhere to, with this reservation—that the
railroads must share more equally than hith-
erto the burden of hard times. Until now,
as a general rule, and particularly so far as
the Baltimore and Ohio Railroad is con-
cerned, the carrier has taken all the profits,
while the miner had barely enough to cover
cost. For years the Cumberland operators
have been ground between an upper mill-
stone, the railroad, and a lower one, the

men. The latter were taught reason after a
disastrous, long-continued strike; the former
is now beginning to realize the fruits of a
policy which has simply led to the opening
of rival fields, and threatens to pare down
profits to a minimum for many years to
come. It now carries coal to Baltimore
from Cumberland at about \$1.

It is now hardly two months that the soft-
coal pool has enjoyed a troubled existence.
It was viewed with suspicion from the start,
had lost some of its influence soon after its
inception, was first secretly and then openly
violated, and now has lost even what little
shadowy substance remained. It is true
that the "soft-coal pool commissioner" still
thrives in his office in Philadelphia, and
that the railroads still keep up a show of
living up to their self-imposed obligations.
They threaten recalcitrant sellers of cheap
coal with dire penalties, but have evidently
lost any power to control them, if, indeed, it
is their real intention to stop cutting. It
looks even as though the railroads them-
selves are not too anxious to hold to the
spirit of their agreement. The Baltimore
and Ohio Railroad has exceeded its per-
centage of the tonnage, and has asked ship-
pers to divert their coal to Canton, offering
to barge it free of cost to Locust Point.

During the last week one of the heaviest
producers in the Clearfield district has
broken loose entirely, and has been taking
contracts for soft coal in this market at fig-
ures varying between \$2.85 and \$2.90. The
coals of the Reading Vanderbilt road, of the
Lehigh Valley Railroad and of the Norfolk
and Western Railroad have made a very
sharp and quite successful effort for business,
and the movement of the Clearfield pro-
ducers referred to is simply one dictated by
self-defense.

A number of very serious blunders were
made in attempting to control the trade.
The railroads undertook to dictate to ship-
pers the minimum prices at which they were
to sell in the leading markets. They did so
without entering into any agreement with
the producers of the coal, on the principle,
presumably, that it required only a refusal
to make lower rates than those admitting of
selling below the figures named. It is cer-
tain that in doing this they went beyond
the legitimate province of a railroad, which
has the right of quoting reasonable mini-
mum rates of freight, but certainly has not
the right to dictate the selling prices of the
articles which it transports. They made
the further serious mistake of assuming that
the quality of the Cumberland and Clear-
field coals is equal. It is not, and the nat-
ural result of an effort to place producers on
a footing of equality in this respect is to give
advantages to those selling the better fuel,
which the Cumberland coal unquestionably
is. They blundered seriously when they as-
sumed that it would be possible to ignore the
large tonnage not controlled by them, es-
pecially since the coals brought to tidewater
markets by other roads were unknown to
consumers and could only get a trial by
tempting concessions. Newcomers are al-
ways a disturbing element, but their influence
becomes fatal to any attempt to hold up mar-
kets when the supply even without them
exceeds the demand. This condition of
affairs exists to-day and is likely to continue
for some time to come, even if the volume
of business should show some growth. There
is every prospect, therefore, that cheap steam
fuel will be one of the blessings enjoyed by
manufacturers in the Eastern and Middle
States in the future.

The decline in soft coal again opens the
gap between it and anthracite, and can-
not but react upon the latter. It may be
stated in this connection that the reports
current in many circles concerning the
placing of a contract with the Brooklyn El-
evated Railroad at a very low figure is much
exaggerated. The figure generally named
is fully 25 cents below the actual selling
price. The fall in prices of anthracite thus
far is not by any means as heavy as is gen-
erally contended. Thus we are credibly
informed that the Hudson River blast fur-
naces are only paying 45 to 50 cents per ton
less for their coal than they did last year.
What the results will be if the strain upon
the anthracite combination causes its entire
collapse is quite a different matter. Indica-
tions point in that direction, but it would be
unwise to depend upon its consummation.

The growing quantity of steel used for
structural purposes has attracted some at-
tention. One of the largest, if not the
largest, works in the country is steadily in-
creasing its make of steel, while it is more
and more departing from the use of wrought
iron, and other establishments which were
producing steel exclusively for railroad pur-
poses are turning to the manufacture of
structural shapes. An animated discussion
of the relative value of the two materials
may therefore be looked forward to at an
early date. An argument is now being heard
which will probably grow in favor with the
supporters of wrought iron for beams, for
instance. It is urged that the duty of a
beam is to maintain absolute rigidity; that
the material of which it is composed is not
to be subjected to stresses taxing its final
tensile strength. Any material, whether it
be iron or steel, can sustain certain loads
before the slightest change in its external
form takes place. The effect of strains up-
to that point will be a state of intermolecu-
lar tension, which to a certain degree even
the slightest load produces. It is held that
the value of a material which is to be used

for a beam depends upon the load which it
can carry before that intermolecular tension
has reached a point where it finds expression
in the first evidence of deflection. It is
argued that it is not so much the mechanical
resistance of the material to loads after that
point has been reached as the preliminary or
intermolecular tension a material will bear
which determines its value as a beam. It is
argued that the efficiency of a beam in this
respect is proportional rather to its mass
than to the mechanical qualities of the ma-
terial, and that, therefore, it is misleading to
claim that because steel has a higher tensile
strength a smaller weight will bear the same
loads before deflection sets in. The rigidity
of a beam, therefore, depends not so much
upon the quality of the material, but upon
its mass.

The Right to Rescind Iron Contracts.

The seller of goods always has the right to
rescind the contract and retain the goods
sold, if he has not already delivered them, in
case the purchaser becomes insolvent and
presumably unable to pay for them in full.
Precisely what circumstances will constitute
insolvency and justify the seller in retaining
the goods it is a little difficult to determine.
It would certainly not be necessary for him
to wait until the purchaser makes a general
assignment for the benefit of his creditors,
or is legally declared a bankrupt by some
court having jurisdiction. It would be suf-
ficient if he had any reasonable cause for be-
lieving the purchaser financially embar-
rassed. But, if he should refuse to fulfill
the contract and deliver the goods without
such reasonable cause, the purchaser can
compel him to perform, and may, moreover,
sometimes recover heavy damages for breach
of contract, and for all the incidental loss
occasioned him thereby. But the contract
having once been justifiably rescinded can-
not afterward be enforced by the purchaser,
even if he tenders the full cash price. It
might sometimes be of great advantage to
him to be able to do this, as the contract
price may have been comparatively low, and
the market may have greatly advanced sub-
sequent to the making of the contract. Two
or three cases of this kind recently oc-
curring in the iron trade in England are of
great interest and importance even to
American business men, as the law here on
this subject is the same as it is there.

In the first case the defendants, Bain &
Co., were manufacturers of hematite pig iron
at Harrington, Cumberland. The plaintiffs,
Morgan & Co., were manufacturers of sheet
iron and tin plate at Kidderminster. Mor-
gan & Co., thinking there was going to be
an advance in the price of pig iron, wrote to
Bain & Co. in February and ordered 200
tons of iron, to be delivered 25 tons monthly,
at £5 per ton, net cash, or by four months' bill,
with 2/6 per ton added. By the usage
of the iron trade, no delivery was due under
this contract until the 1st of April. At the
time of making this contract Morgan & Co.
were insolvent. They were aware during
the time that they were in difficulties, but it
was not until the 12th of March that they
found they could not meet their liabilities,
and determined to suspend payment. They
petitioned the bankruptcy court for liquida-
tion by arrangement or composition. On the
5th of April, at the first meeting of the
creditors, a resolution was passed to accept
a composition of 5/ in the pound. No step
was taken in relation to the contract by
either party until the 13th of May, when, the
iron market having risen, Morgan & Co.,
the plaintiffs, claimed the delivery of the
iron in fulfillment of the contract, and of-
fered to pay cash for it. Bain & Co. replied
that they (Morgan & Co.) having failed to
perform their part of the contract, it was at
an end, and refused, therefore, to deliver,
claiming their right to rescind. Morgan &
Co. then sued Bain & Co. for the non-delivery
of the iron. It was decided by Lord Cole-
ridge that the facts gave the defendants,
Bain & Co., the right to rescind, and Morgan
& Co. could not enforce the contract.

In another iron contract the Carnforth
Hematite Iron Company contracted to sup-
ply the Phoenix Bessemer Steel Company
with iron at a certain price, to be delivered
in monthly installments, and to be paid for
by bills at four months and the rest on still
longer credit. The installments were de-
livered regularly for three months, when the
purchasing company called a meeting of
their creditors and stated to them that they
were carrying on the business at a loss, were
short of working capital, and asked for an
extension of credit on existing contracts.
This was refused. The selling company
then declined to deliver any more iron
except upon immediate cash payments, and
in consequence of this refusal the pur-
chasing company (the Bessemer Steel) gave
notice that they rescinded the contract.
The Carnforth Company claimed damages
for breach of contract. It was decided that
there was no such declaration of insolvency
as to justify the selling company in refusing
to deliver the iron except for cash payments,
and consequently the purchasing company
had the right to rescind the contract. The
general rule was laid down that, to justify
a seller in exercising his right of refusal to de-
liver, there must be such insolvency as
shows an intention not to pay for the goods,
or an absolute inability to do so.

That circumstances will not give the right
of rescission in cases where insolvency is not
a factor, is shown by another iron contract,
where the defendant, Burr, agreed to de-
liver to the plaintiff, Freeth, 250 tons of pig
iron at \$6/ per ton, half to be delivered in

two and the remainder in four weeks, pay-
ment to be net cash, 14 days after the de-
livery of each parcel. The market was
rising, and, notwithstanding urgent demands
by the plaintiff, the delivery of the first 125
tons was not completed for nearly six months.
The plaintiff, Freeth, refused to pay for the
first parcel, claiming a right to set off the
loss he had sustained from being obliged to
procure other iron in consequence of the de-
fendant's (Burr) default, but he still de-
manded the delivery of the second parcel.
Burr, treating the refusal to pay as a breach
and abandonment of the contract by Freeth,
declined to deliver any more. The price of
the first parcel was ultimately paid. It was
decided that the defendant, Burr, could not
rescind in this way and refuse to deliver the
iron. The plaintiff was entitled to damages
for the breach of contract.

The Freight Pool Dead.

The dissolution of the freight pool of the
trunk-line system is prominent among the
events of the past week. For months it has
had only a precarious existence, relieved by
occasional flickers of vitality, and now it is
pronounced dead. At a meeting held a few
days ago, all the roads being represented, it
was resolved, after discussion, that the cus-
tomary traffic settlements between the sev-
eral lines through the pooling agency be
suspended. It was represented that the
pooling arrangements had been generally
successful until "new sources of distur-
bance" arose, against which it was useless to
contend, as there was no promise of a cessa-
tion of the warfare "until the weakest of
the competitors was taken out of the field."
This action is significant from the fact that,
while the semblance of a pool may be con-
tinued, the several roads heretofore con-
cerned have now no remaining alternative
but to do business on such terms as they may
be able to command.

The final demerit is directly attributa-
ble to the recent action of the Grand Trunk
line, whose general manager is reported as
saying that the position of the trunk lines,
and indeed of the whole railway properties
of the northern part of this continent, is just
about as bad as it possibly could be under
almost any circumstances. The large com-
panies are drifting without any settled
policy, and there is no one with sufficient in-
fluence and commanding sufficient confidence
to control the situation. The companies
with the largest capital, and which ought to
be most conservative, are pursuing a reck-
less policy, partaking more of the charac-
teristics of the Commune than of a conserva-
tive management which commands the con-
fidence of investors. So radical a measure
as that of reducing the passenger fares be-
tween New York and Chicago to \$1 per head
might, without attracting public attention or
perhaps materially affecting any interests,
be resorted to by a bankrupt corporation,
but resorted to by a corporation representing
the largest amount of capital invested in rail-
ways under one control on this continent
the step amounts to little short of revolution.
How the position thus assumed is to be got
away from no one is able to foresee. The
pooling system has literally broken down,
not owing to any want of energy or ability
on the part of the commissioner, but entirely
owing to the representatives of railway
interests involved withholding their support
to well-conceived and perfectly practicable
measures for concerted action on a reason-
able basis. No one is able to define whether
the lack of support of Mr. Fink results from
personal jealousies, lack of capacity or in-
terested motives. The railway problem is
approaching that phase which will attract
the earnest attention of the public, and it is
highly probable that it will not be settled
until public interest in it has been reflected
in legislative enactments, and those charged
with the administration of corporate prop-
erty are forced to act purely in the interest
of their trusts and free themselves from the
embarrassing influences of speculators.

In the interest of Western railroads a
"Central Traffic Association" has been
formed, covering the competitive business
in the territory north of the Ohio River and
between the Mississippi and the trunk-line
termini, but its existence for any lengthened
period is spoken of as questionable. Mean-
while merchants are able to drive their own
bargains with railroad corporations precisely
as with individuals, and may have no reason
to regret the necessity.

Quality Guarantees for Tin Plates.

The practical value to importers and con-
sumers of the system of guaranteeing tin
plates, first advocated by *The Metal Worker*
of this city, are now fully recognized and
will probably be conceded by all in the trade.
Some time since we called attention to
the wholesome rivalry that exists between
prominent importing houses in this country
with reference to the terms of their guaran-
tees upon the better qualities of tin plates
which they put out. Makers in England
and Wales are manifesting the same spirit,
and the guarantees under which some plates
are put forth seem to leave nothing to be
desired upon the part of the fair-minded
consumer. Our attention has recently been
called to a circular issued by the Clayton
Tin Plate Company, Limited, with works at
Pontardulais, South Wales. That portion of
the circular of special interest to our readers
is in the following terms:

"Our plates are guaranteed to do the
work set under each brand, and to fully
maintain their quality at all times.

"Clayton" Brand.—These plates are made from steel bars, made under the Siemens-Martin process; are heavily coated, the surface best finish, and fully equal to best charcoal. The plates are suitable for dairy utensils and all articles in which water stands; puff pans with hollows; baking plates, with square edge; deep stamping and spinning; hand hollowing and raising, as raised-top tea-pots; bellied saucepans, ovals and rounds. Will stamp to a sharp edge as paneling for biscuit-boxes. Will seam, double seam, and will planish or buff up for bright goods.

"Lundy" Brand.—Same basis as "Clayton," but less heavy coating, good surface. Will stand the same working tests as "Clayton."

"Mona" Brand.—These plates are made from best soft-steel bars and of coke coating of tin; are suitable for heavy stamping, the same as "Clayton."

"Caldy" Brand.—These are made from best quality Bessemer steel and of best coke finish; are suitable for stamping, as deep as the diameter of the stamp, all moderate depths of fluted or rounded articles; spinning of all kinds; hollowing and stretching by hand-hammering, for oval or round articles; seaming and wiring. For dry gas meter cases, ornamental panels of biscuit-boxes, tea-kettles, saucepans, of second quality, fish-kettles. Will seam and turn over way of the grain, but not across the grain.

"Lima" Brand.—These plates are made of steel, and are well coated with tin sufficiently bright for oyster canning, wet packing, &c.

The critical reader will notice that by the terms of the above guarantee the plates are warranted, first, to do the work mentioned under each brand, and, secondly, to fully maintain their quality at all times. The latter feature of a guarantee is of the greatest importance in establishing a property value in a brand, and, while it may be supposed that makers in general aspire to uniformity of quality, we do not remember ever having seen a guarantee worded in just this way. The specification under each of the different brands is complete, and of a character to meet the reasonable requirements of the consumer, wherever he may be found. By the terms used in the statement of what the plates will do, the guarantee was evidently written from an English rather than an American standpoint. It will be noticed that the lack of definite standards by which to express qualities is experienced by the firm putting out these guarantees. Their "Clayton" brand, which is a steel plate, they guarantee to be equal to "best charcoal." This in itself means nothing; but the qualification of this guarantee, wherein it is stated that the plates are suitable for certain purposes makes it entirely satisfactory. Variation in thickness of coating is taken into account, as is evidenced by the statement that a "Lundy" plate has the same basis as a "Clayton," but a thinner coating. "Mona," we take it, is still a step lower in the scale, while the "Caldy" is a plate made of Bessemer steel and thinly coated. The description of this plate in the guarantee is particularly satisfactory. Even a disclaimer is inserted which will prevent the purchaser from anticipating too much from it. "It will seam and turn over the way of the grain, but not across the grain." The "Lima" brand evidently is a very ordinary article of plate, but it is carefully described in the circular.

A further progress in this direction is immensely desirable. We would suggest, however, that time would be saved and meanings made clearer if, in descriptions intended for American consumers, the standard American quality designations were used. In the case of "Clayton" plates, LY conveys as much meaning to the trade in this country as the twelve lines of description given it. The other plates would, we presume, be appropriately graded as LV, KT, FT, and DS respectively. If so graded, the importer would know just how to guarantee them, and the consumer, on such guarantee, would know the uses for which he could employ them quite as well as the manufacturer possibly can. The plan of the Clayton Company is a step in the right direction, and we shall be glad to see all British tin-plate makers follow it; but if they wish to make their meaning clear they can do so most easily by adopting the gradings now better understood by importers and consumers here than any description based upon English shop practice.

The Franklin Institute, of Philadelphia, which has long been noted for its enterprise and the general assistance rendered to the mechanical industries of the country, distinguished itself last year in the way of an exhibition by restricting the display to one general class of articles. The exhibition was limited to electrical appliances, and the general public was astonished to see in how many different ways electricity is employed in modern life. It proposes an equal novelty the present year. On the 15th of September there will be opened an exhibition which will be called the Novelty Exhibition. It is to be restricted to an exhibition of recent discoveries and inventions in the field of science, art and manufactures which may be deemed of sufficient merit to warrant such a place. It is not intended that the display shall be confined to any special class of subjects, nor is it designed as a general exhibition of arts and manufactures, but is to be restricted to novelties, as before mentioned. The advantages of such an exhibition must

be apparent to every one. It will give the inventor the opportunity of bringing to the attention of the public his peculiar ideas without danger of being overshadowed by exhibitions, which, however meritorious, are not distinctively new. Equal advantages will be afforded to the general visitor, who will have a chance of becoming acquainted with the most recent developments in various lines without the necessity of searching through that which has been examined many times before. The matter of industrial exhibitions has been overdone in this country the past few years. Their importance has been lessened by their number. Where a short time since a few very important exhibitions were held each year, at present the rule is for each large city to have its own industrial exposition. The attention of the public is divided, and it becomes impossible for inventors and manufacturers to exhibit their goods at all of them on account of the great expense involved. Accordingly the value of each exhibition has been lessened until it is purely a local affair, in many instances worth scarcely more either to the exhibitor or visitor than the old-time State and county fairs which these forms of exhibition have to a great extent superseded. A change is absolutely necessary. Either the local exhibitions must be concentrated into one national exhibition and held at longer intervals than once each year, or they must become special exhibitions, after the style to be inaugurated by the Franklin Institute. The latter idea is much more likely to succeed, and accordingly we may expect such to be the development for the next few years.

It appears that the Metropolitan Telephone Company, of this city, in defiance of all the arguments of the overhead-wire advocates, are about to make a practical trial of transmitting telephonic messages through underground wires. The wires, some 200 in all, insulated in the ordinary way, are drawn through an iron pipe, the remaining space being filled with an insulating material. The cables are laid in lengths of about 20 feet, and these are connected by junction boxes, which simply allow the mass of wires to spread in order that one or more of them may be reached for the purpose of making connection with a subscriber's instrument. Four of these cables are now being laid from the company's Twenty-first street office. At the terminal points, where the cables connect with the old system, the wires will be carried to poles and continued in the ordinary way, but these terminal points, it is said, are only temporary, as the company intend to continue the cable system if it proves satisfactory. The method of laying the cable is simply to open a trench about 2½ feet deep and of working width, say 2 feet, in which the sections are laid with the ends connecting with junction boxes. As the most opposition to the burial of the wires has come from the telephone companies, the result of this trial will be watched with considerable interest. Having proved conclusively—on paper, at least—the impossibility of subterranean telephoning, it may surprise many that any company should so waste their money in an endeavor to accomplish the impracticable. But the public, happily, will soon know whether the new system is in reality impracticable or not. In this connection we would refer to an item in one of our electrical contemporaries, who, having apparently exhausted the arguments of science in defending aerial wires, has descended to humanitarian grounds of defense, and cites the case of a telegraph pole being used as a fire escape, as showing the advisability of letting the wires remain undisturbed. Our contemporary omits to state, however, whether he is in favor of the general substitution of telegraph poles for fire-escapes throughout the unwired districts of New York.

Chili Since the War.

The steady depreciation of Chilean paper money, of which there is not an exceptionally large amount in circulation, has caused a good deal of surprise both at home and abroad, the more so as the late war on the Pacific, instead of draining the resources of Chili, vastly increased them, and enabled the Government to meet all its liabilities promptly during and since the termination of hostilities. The depreciation of Chilean paper money has an interest even abroad, inasmuch as the decline in copper, for example, in the world's markets has been less felt in Chili, the mines receiving in dollars, depreciated it is true, as much money of the country at £44 for Chili bars in London as they received when the price was £66, with the exchange higher in proportion. The abolition for 18 months of the export duty on copper, however, co-operated in sustaining the mining interest. As Italy under less favorable circumstances has resumed specie payments, and Greece does not find it difficult to follow in the wake of Italy with even less resources, the credit abroad of neither standing higher than that of Chili, there is a belief in the latter country that the management of her finances has not been in clever hands. It is insisted that a loan of £2,000,000 in London would suffice to resume specie payments, and all are aware that Chili could easily raise the money on favorable terms.

Chili is in most respects so differently situated, politically, from all other Spanish-American countries that it may not be amiss to reproduce the following from the London *Fortnightly Review*, which gives a clear idea of the reasons why revolutions are a thing unknown in Chili:

"The political constitution of Chili consists of the President and Legislature or National Congress, composed of an Upper and Lower House, the former renewed one-third every three years, the latter elected triennially.

The President is elected every five years by the people, and is not eligible for re-election except after an interval of one term. Under him are five Ministers and a Council of State, composed of 11 Members, five of whom are chosen by the President himself under certain regulations, and the other six elected by the Congress, their term of office being for three years. The salary of the President is \$18,000 a year, the present holder of that office being Don Domingo Santa Maria. The Ministers receive \$6000 a year, and the Members of the Council of State give their services gratuitously. The various Provinces are ruled by Intendentes (Governors) named by the President and removable at his will. The departments are administered by Governors appointed in the same way, and there are sub-delegates, who are unpaid, corresponding to our unpaid magistracy. The Members of Congress, of whom 37 belong to the Senate and 108 to the Lower House, are, like our Members of Parliament, chosen from among the richest and most influential men in the country. Although Chili is called a Republic, it is governed in a very conservative manner. The change of parties there means simply the retirement from office of one set of rich men to be succeeded by another set of rich men, both parties holding much the same views, and being absolutely in accord as to the paramount necessity of peace and order. Chili is the only South American country possessing an unpaid National Legislature, and to this must be attributed in no small degree her singular immunity from corruption. In no other South American country are the Members of the Legislature of higher standing and position than those of Chili, and in no other country is property safer, the people more orderly or the standard of patriotism higher than in this one. The fact that political services are unpaid is a great damper to the professional politician, who—a familiar figure in most of the other American communities—is ready to support anybody or anything so long as the result of his election is so much a year to himself during the sitting of Parliament. If other South American nations had been governed as Chili is, by those who, having their wants supplied so far as mere money could supply them, were less accessible to the debasing influences of corruption, they would have made greater advances, and the large external debts which not only have impoverished the lenders, the unfortunate bondholders, but have actually impoverished the people to whom the money was lent, would for the most part never have been incurred. If the heads of the Government are corrupt, and make their hundreds of thousands out of some gigantic financial job; if the representatives of the people make a traffic of their opinions and their votes, how are the minor officials expected to be honest? Is it to be anticipated that the customs house officer will be proof against a bribe, or the judge do justice without favor? It thus comes about that in many of the South American States, though in theory there is democracy, in practice there are no countries where the unscrupulous use of wealth gives greater weight and influence."

On the occasion of a recent interpellation in the Chilean Congress the Minister of Finance gave it as his opinion that the exchange on London was not a barometer for the financial status of the Republic, and the Minister of State added that during the three years of the present administration many public works had been undertaken and partially finished without recourse to loans or the issue of a dollar of fresh paper money; that on the contrary \$6,000,000 of floating debt had been extinguished, all the war expenses paid, leaving the Treasury with a reserve fund of several millions. He stated that, even supposing \$2,000,000 less were collected from duties, the budget would be squared, the income being estimated for the current year at \$36,500,000, and the cost of carrying on the government at \$34,500,000.

In 1879, he remarked, but a trifling amount of paper money had been issued, yet the exchange on London dropped to 24d., in order to gradually recover to 36d. at a time when the issue of paper money was at its height. In the opinion of the Minister of State, the present low rate of exchange of 26½d. is due altogether to the large amount of goods imported into the country, disturbing the so-called trade balance. Chilean copper, wheat, flour, barley and nitrate bringing very low prices abroad. The only thing, he added, that would permanently help the copper-mining interest of Chili would be railroads to connect the mining region with the coast and enable copper smelters to get cheaper coal. He stated that other countries had cheap coal at their disposal and could produce copper cheaper, although their ores are poorer than the Chilean. He concluded by insisting that every effort should be made to cheapen production of Chilean export, and the monetary anomaly which seemed to puzzle everybody in and out of Congress would soon disappear.

The following figures will show how slightly the low prices last year affected copper exportation from Chili:

Export from Chili to all Countries—Tons Fine.			
1876.....	50,912	1881.....	38,190
1877.....	45,562	1882.....	43,129
1878.....	46,911	1883.....	41,229
1879.....	49,591	1884.....	45,700
1880.....	48,135		

Chili, with the new acquisitions from Peru and Bolivia, covers an area not quite as large as Texas, measuring 260,000 square miles, with a population of 2,500,000, or 1,000,000 more than Texas. Santiago, the capital, has 200,000 inhabitants, and Valparaiso, 95,000. The national indebtedness on January 1, 1884, stood as follows:

Foreign debt, payable in gold.....	\$34,870,000
Home debt, payable from 3 to 9 per cent. interest.....	20,129,393
Paper money in circulation.....	27,000,000
Total.....	\$87,999,393

Not only is the bonded debt small, considering the resources of the country, but the outstanding paper money is so trifling in amount that it could be easily withdrawn through a sterling loan; besides, against a large portion of the debt the Government holds railroad and telegraph lines.

The Chilean merchant navy consists of 131 sailing vessels and steamers, measuring to-

gether 53,071 tons, and including 27 steamers of a joint capacity of 12,512 tons. Of the 1383 miles of railway in operation the Government owns 598; out of the 6895 miles of telegraph the Government owns 5635. There were in 1883 in operation 343 post offices, dispatching during the year 21,777,939 items of mail matter. Chilean trade developed as follows:

	Import.	Export.	Revenue from customs.	En'd Ton'ge.
1870.....	\$28,324,139	\$26,075,819	\$6,488,182	5,091 2,510,000
1880.....	30,162,421	51,648,549	10,645,349	6,000 4,020,333
1881.....	30,594,814	60,525,850	22,425,046	7,409 5,484,122
1882.....	50,062,217	71,369,604	22,306,272	8,332 6,616,330

American trade with Chili would be greater if that country's productions were not in a great measure confined to goods which we produce ourselves in abundance, and cheaper. The only article which Chili controls and to a degree indispensable to us is nitrate. England is the chief customer for Chilean products, and, of course, also ships correspondingly large amounts of coal and manufactures to Chili. Thus, out of the \$50,992,000 worth of goods which Chili imported in 1882, \$22,586,000 came from England, and of the \$71,210,000 worth of products shipped abroad from Chili, \$52,807,000 went to England.

American Trade With Chili.	
Import from Chili into the United States:	Domestic export from the United States to Chili.
Fiscal year.	
1881.....	\$435,584
1882.....	537,933
	\$2,837,551
	3,336,945

In future statistics of American trade the amount of goods received from Chili will be considerably larger, as the nitrate hitherto figuring under imports from Peru will appear under Chili, which may in some years make a difference of a couple of million dollars to the credit of the latter. The fact that Chili, the only positively reliable Spanish-American country, has issued victoriously and with most valuable acquisitions from a formidable war which was meant to cripple her irredeemably, makes a vast difference in South America. The conservative influence of the model Republic in those latitudes, backed as it is by a formidable military power, can hardly fail to serve as a check on the turbulence and ambition of other States. It is therefore greatly to be desired that the men at the helm of affairs in Chili should be good financiers, that they do away with the paper currency, and place their country in every respect in the enviable position which her bravery and patriotism entitle her to.

WASHINGTON NEWS.

(From Our Special Correspondent.)

WASHINGTON, D. C., May 5, 1885.

THE REFUND OF DUTIES ON STEEL BLOOMS.

The announcement in this correspondence of the names and amounts of refund of duties on steel blooms, just concluded by the Treasury Department, has led to numerous inquiries at the department by letter from various parties as to whether the refund applies to all importers of such blooms. The department replies that it does not, but only to those who have complied with the provisions of Section 3012, Revised Statutes. Parties to whom the refund was made were those only who had complied with the laws and regulations. Under this ruling the importer who made entry of goods, if he considered the rate of duty too large, must have made protest specifically objecting to the rate of assessment; he must have appealed within 10 days from the assessment made by the collector, and within 30 days from the decision of the Secretary of the Treasury affirming the decision of the collector must have brought suit in the courts. The Secretary will make no refund to parties who have not complied with these requirements. It might be added that the Secretary has no discretion in the premises, as the law specifically defines the course of procedure in such cases of appeals. It seems rather an inequitable proceeding, as those who acquiesced in the action of the department are made to suffer. The only redress at this time would be an act of Congress authorizing the Secretary of the Treasury to refund these duties.

TAGGERS IRON.

A question has arisen in regard to the duty on taggers iron. The tariff fixes the duty on common or black at 30 per cent. ad valorem. Taggers iron "which has been pickled or cleaned by acid or by any other material or process, and which is cold rolled," is required to pay 30 per cent. ad valorem and ¼ cent per pound additional. The department decides that the iron to be dutiable at the higher rate must be pickled or cleaned by acid and cold rolled, and not pickled or cleaned by acid or cold-rolled. The higher rate is only chargeable where all the above conditions are complied with. There appears to be much difference of opinion among experts as to the classification of certain importations of this article.

SYNOPSIS OF DECISIONS.

The following is a synopsis of the latest customs decisions of the Treasury Department: Silver ore which has been crushed or ground in, under Paragraph 666, which embraces gold and silver ores, regarded as ore up to the point of the extraction of the metal therefrom, and Decision 6581 is modified accordingly. Allowance for damage occurring to imports on the voyage of importation cannot be made in the assessment of duties, unless the proof to ascertain such damage is lodged within the 10 days specified in Section 2927, R. S. The fact that an importer was prevented by circumstances beyond his control from examining the merchandise within such 10 days, or from other causes was prevented from lodging the requisite proof within the statutory time, does not operate to confer authority for the allowance of such damage in the absence of the statutory claim.

IRON FOR HORSE-SHOE NAILS.

The Secretary of the Treasury has still under consideration whether certain importations of peculiarly-shaped iron for horse-shoe nails is bar iron specifically provided for, or in a form not otherwise provided for. The difference in duty under the old tariff was ¼ cent a pound. Upon the decision

rests the question of a considerable refund of duties.

THE NAVY.

The Secretary of the Navy, in conversation with the correspondent of *The Iron Age*, said that he was giving much attention to the subject of rebuilding the navy, and in the course of a few weeks would extend his investigations by conferring with the chiefs of bureaus and other experienced naval officers on the same subject, so as to be able to come to some conclusions as to the best course to pursue. He believes that the present Congress when it convenes in December will take some action in the premises, and will make liberal appropriations, so that the work may be commenced at once. He thinks that a liberal policy in this connection would contribute largely to a stimulation of the industries by the large Government demand it would make for iron and steel and other materials entering into the building and equipment of vessels of war. Our navy, the Secretary admits, is in a sorry plight, and demands early and earnest attention. He says that we could hardly muster 30 effective vessels in case of emergency, and have no guns and appliances of modern naval warfare worth speaking of. Nor has the Government the plant for building modern ships or armaments. In other words, should Congress appropriate for a new navy, it would be necessary to begin by building a plant to do the work.

THE TARIFF.

Representative Morrison, who is in the city looking after the Illinois Marshalling for his friends, says that if he is in the House next winter, possibly thinking that there may be a chance of his getting into the Senate, he will do what he can to bring the tariff question to an issue. In reply to an inquiry as to whether he could count on a united Democratic front, he said that his party would be practically harmonious on the basis of a general revision of the tariff, and from that starting point he expected to be able to effect some material modifications of the present tariff. He believed that an alliance could be made with the silver men which would greatly strengthen the movement. He does not anticipate any difficulty in securing the re-election of Mr. Carlisle to the Speakership, and, that being accomplished, expects to resume his old place at the head of the Committee on Ways and Means.

MR. RANDALL AND THE STEEL INVESTIGATIONS.

The physicians having enjoined upon Mr. Randall absolute rest from labor, there may be some delay in going on with the inquiries into the steel-producing capacity of the United States. As this is part of the work preliminary to the appropriation of money for large guns and coast and naval armaments generally by Congress, it is possible he will call the committee together and at least start them on their work.

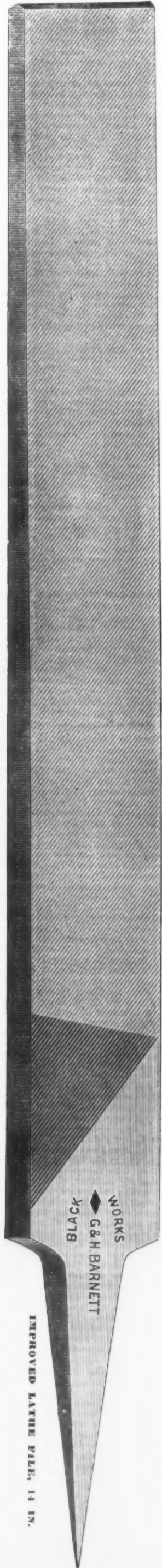
Art Work in Iron.—Wrought iron as a decorative material has for years been used to advantage abroad, but not until quite recently have architects and others in America had their eyes opened to its beauty and availability. Of late the rage for it has grown quite rapidly, owing largely to the efforts of such progressive firms as Thackara, Sons & Co., of Philadelphia, who have devoted a good deal of time and attention to importing fine specimens from abroad and reproducing in their own workshops here the best things in the way of antiques from the forges of the master ironworkers of two or three centuries ago. Just now Messrs. Thackara are making a fine display of wrought-iron work in the windows of their beautiful new store at Thirteenth and Chestnut streets, the articles exhibited including all manner of ornamental work in iron combined with brass and other metals, colored glass, &c. One of the chief features is a stove in the shape of a suit of armor resting upon a pedestal. This is a duplicate of the stove which was made to order for Count Hohenzollern, and which is now in use in his castle on the Rhine. It is valued at \$300. The display also includes a number of ornamental iron lanterns for gas, magnificent gas chandeliers of quaint but elegant design, sanctuary lamps, candlesticks, fire-sets and andirons, plaques and frames, lamp stands, &c. The articles are all noteworthy for beautiful conception and skillful workmanship, and, together with the collection shown inside, make by far the finest exhibition of wrought-iron work ever given in Philadelphia.

On the 2d inst. a decree of foreclosure and order of sale were given by the Circuit Court, St. Louis, Mo., in the suit of Isaac M. Mason vs. Harrison Wire Company. This suit was brought at the instance of Messrs. Kidler, Peabody & Co., bankers, of New York City, who hold \$44,000 of the first mortgage bonds. The formality of allowing three days in which to pay judgment will make the 7th inst. the beginning of the 30 days' notice to be given by Receiver Moffett, who has been appointed special commissioner to sell the plant. This judgment practically supersedes one in the case of A. B. Hart against the same company, and the property will probably be sold in June. The plant consists of an 18-inch billet mill, a 9-inch rod mill, with necessary furnaces, engines, &c., a wire mill, annealing house, galvanizing apparatus, wire-ropes machines, machine shop and usual appurtenances of wire mills.

The works of the St. Louis Hot-Pressed Nut and Bolt Company were sold at public auction on the 30th ult., under a deed of trust to the Mechanics' Bank, Chouteau, Harrison & Valle Iron Company, and Graff, Bennett & Co. The purchaser was the Chouteau, Harrison & Valle Iron Company, and the amount paid was \$12,500. The plant is reported to have cost nearly \$50,000. The purchasers, it is announced, will operate the works.

General Jackson, of Georgia, the recently appointed United States Minister to Mexico, will leave immediately for his post of duty.

It is believed that an adjustment will be reached before the end of the week in the strike at the South Chicago works of the North Chicago Rolling Mill Company.



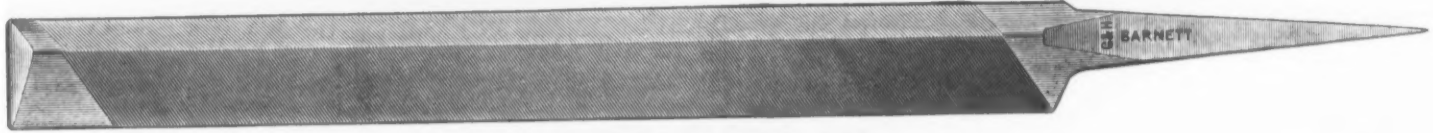
IMPROVED LATHE FILE, 14 IN.



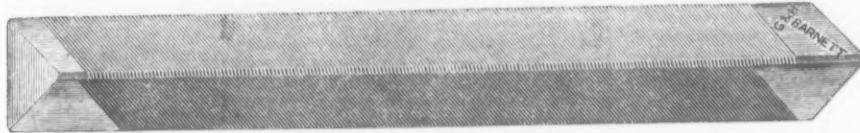
DOUBLE-ENDED TAPER SAW FILES, ALL SIZES. Handles Given with These.



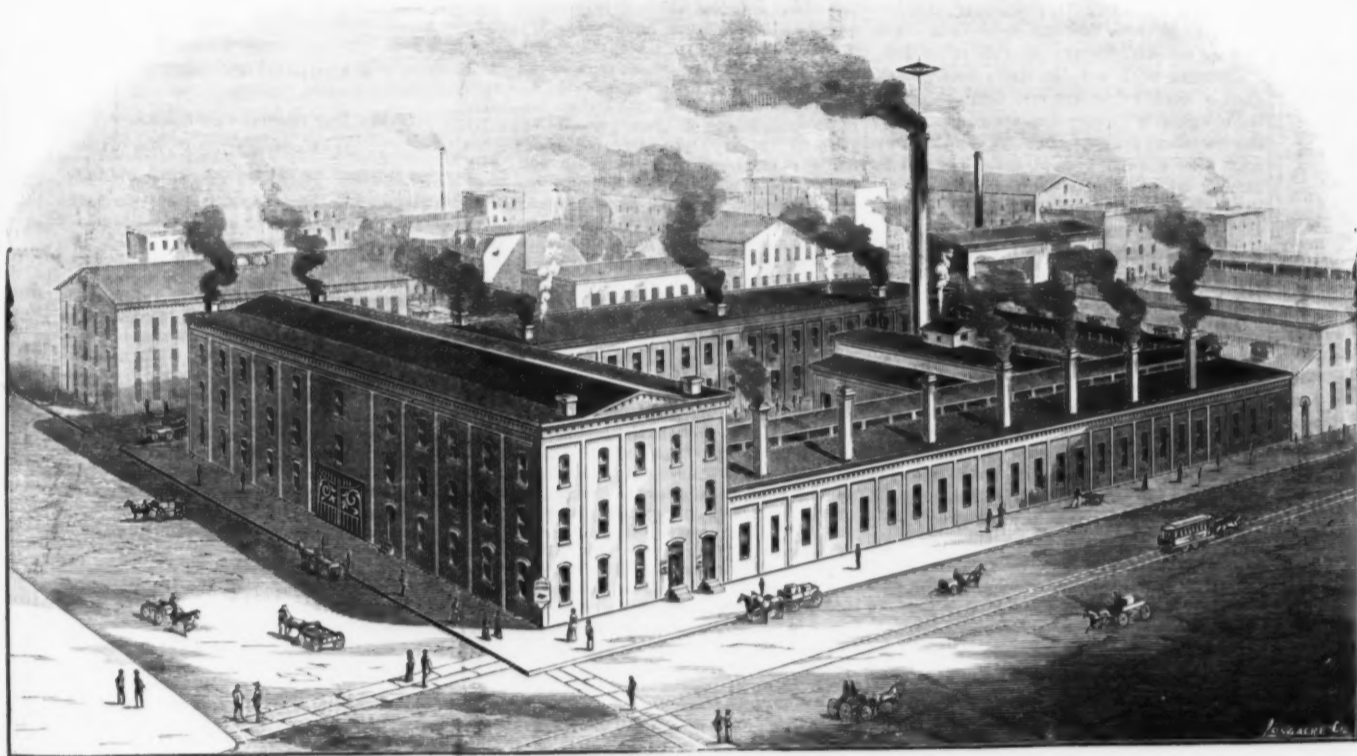
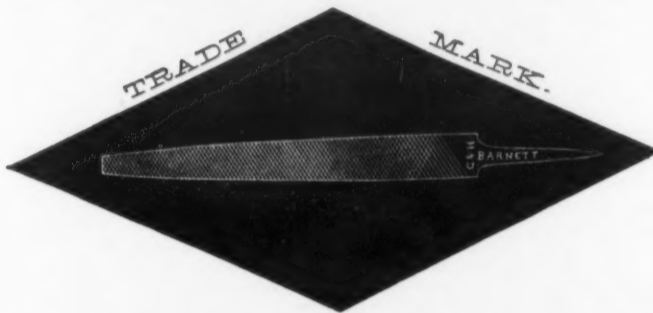
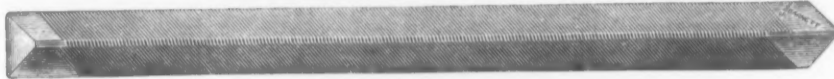
BAND SAW FILES, 6 IN.



CLIMAX SAW FILES, 6 IN.



MACHINE BAND SAW FILES.



CAPACITY,
750 DOZ. PER DAY.

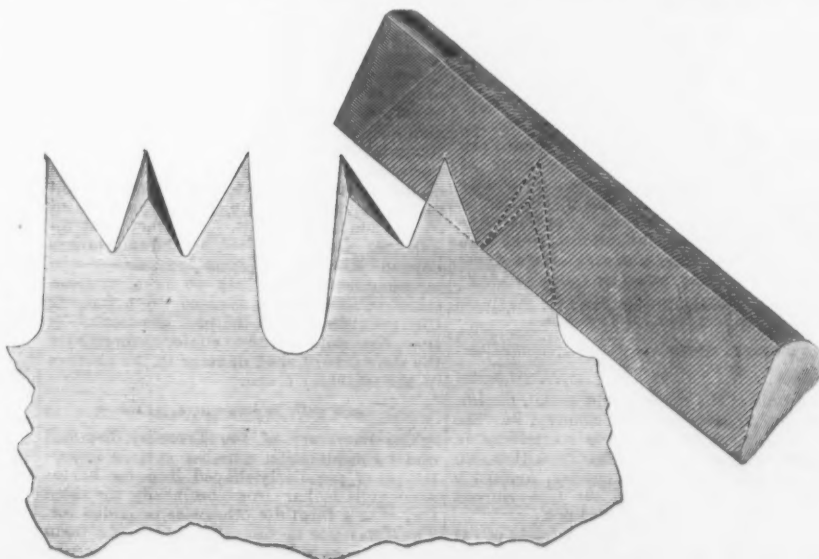


SIZE OF WORKS:
220 feet long on Richmond Street.
220 feet long on Eagle Street.
102 feet deep on Leopard Street.

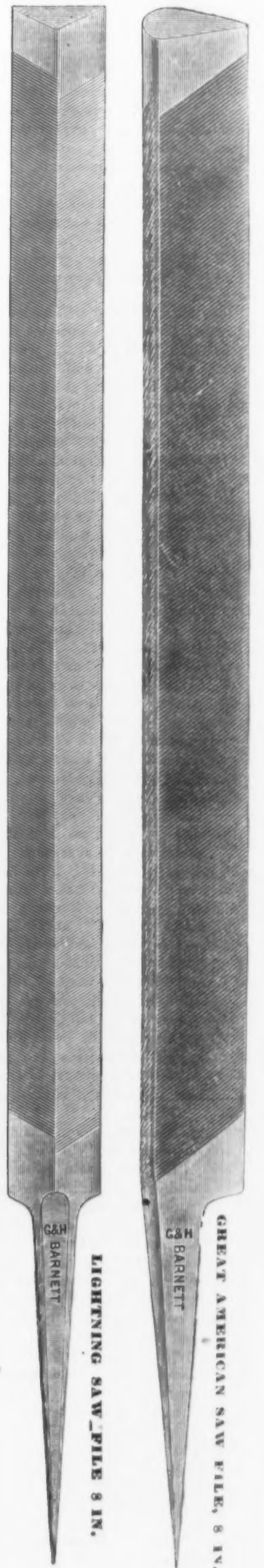
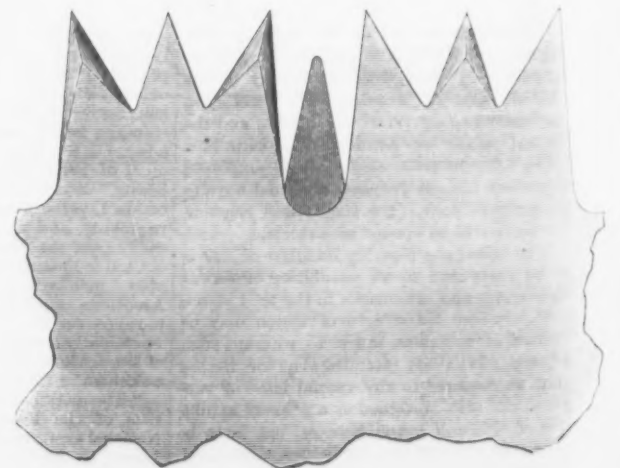
G. & H. BARNETT,

Black Diamond File Works,

PHILADELPHIA, PA., U. S. A.



GREAT AMERICAN
SAW FILE.



Special Notices.

For Sale.

following for real estate or lumber, any part of the
 exchange machinery, subject to inspection before
 purchase
 Train of Lath's 24 in. 3 high Rolls.
 Train of 2-high 22 in. Plate and Sheet Rolls and
 Duplicate Rolls.
 Train of 20 in. Soft 12. 1ls and Duplicate Rolls.
 Compound 18 Inch Buck Train and Duplicate Rolls.
 Large Engine, 12 x 24, horizontal, 25-ton fly, doubly
 braced wheel, 12 in. face
 Large Rotary Squeezer for 150-lb. Ball.
 Large Roll Turning Lath for Turning up Rolls.
 Large Pump.
 Large Cranes for Handling Hoistings and Rolls.
 Plate Shear to shear as high as 4 in. in Plates.
 Sheet Shear.
 Shaping Slicer.
 Buck Shear.
 Scrap Shear.
 Scrap Shear and Engine.
 Large Sturtevant Blower and Pipe
 Insurance Plates for 4 Charcoal Fires, Incl. (ing Valves
 &c.
 Battery of 3 extra large Fire-box Boilers, size 25
 ft. by 24 in. 2 H.P., 15 in., to operate together or
 separate; with all connections
 Large Boiler, fire-box metal, 28 ft. by 24 in. or 44 in.
 Large Boiler, 25 ft. by 24 in.
 Track Scale, Wagon Scale, Mill Scales, Tools, Tran-
 s. ays, Ruggles, ratterns, &c.

FOR SALE.

300 " R. K. Elliptic Spring Steel.
200 "agon and Hugazy Spring Steel.
200 Mixed and Fresh Steel.
100 No. 4 Wt.-iron.
100 Sheet and Ho. iron.
200 Mixed Wrought iron Turnings.
100 Heavy Cast iron Rods.
100 Wire cable.
25 " New "Bage" Horse Shoe Bar.

Also a large assortment of New and Second
and Machinery, Tools and Belting. Correspond-
ence solicited.

A. LIEBERMAN,
Nos. 1448 and 1501 to 1507 State St., Chicago, Ill.

For Sale.

Second-hand

DROPS and LIFTERS.

BEECHER & PECK,
Lock Box 222, New Haven, Conn.

For Sale.

New Heavy Bar Shear; weight, 15,000 lbs.; is $1\frac{1}{2}$ in. x 16 in.; geared eight to one; 2200 lb. Wheel on Pinion Shaft; all complete on a heavy bed plate; requires very little foundation; driven by 8 x 12 inch Engine, attached. A. Catbargain
A. G. BROOKS,
261 N. 3d St., Philadelphia, Pa.

For Sale.

New first-class Machine Tools at very low prices, combining all the latest and best improvements.
Engine Lathes with 6 and 8 foot beds, 16-inch swing,
12-inch swing, with 8, 10 and 12 foot beds,
12-inch swing, with 12 $\frac{1}{2}$ foot bed,
16, 27 and 28 inch swing, with 12 $\frac{1}{2}$ foot beds,
or description, cuts and prices, address
JOS. B. REED,
Cairo, Ill., U. S. A.

For Sale.

The Hardware Stock of the late C. I. Wetmore

very best and has been known as a Hard-
old for 40 years. The stock is clean and fre-
old goods—and comes with Shelf and Build

This is a grand opportunity to secure a well-established and money-making business, as the owners are determined to dispose of this

ENNIE C. O. WETMORE, (Administrative)

Adrian, Mich.
EYER, KINGSLAND & CO.,
Wholesale Auctioneers,
No. 10 Warren St., New York.

regular sales of Hardware, Cutlery, &c. for Cash, and on Commission, and delivered promptly. Consignments of goods so

Bargains.

Horse Horizontal Engine. New.			
10	15	20	25
30	40	50	60
70	80	90	100
110	120	130	140
150	160	170	180
190	200	210	220
230	240	250	260
270	280	290	300
310	320	330	340
350	360	370	380
390	400	410	420
430	440	450	460
470	480	490	500
510	520	530	540
550	560	570	580
590	600	610	620
630	640	650	660
670	680	690	700
710	720	730	740
750	760	770	780
790	800	810	820
830	840	850	860
870	880	890	900
910	920	930	940
950	960	970	980
990	1000	1010	1020
1030	1040	1050	1060
1070	1080	1090	1100
1110	1120	1130	1140
1150	1160	1170	1180
1190	1200	1210	1220
1230	1240	1250	1260
1270	1280	1290	1300
1310	1320	1330	1340
1350	1360	1370	1380
1390	1400	1410	1420
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1790	1800	1810	1820
1830	1840	1850	1860
1870	1880	1890	1900
1910	1920	1930	1940
1950	1960	1970	1980
1990	2000	2010	2020
2030	2040	2050	2060
2070	2080	2090	2100
2110	2120	2130	2140
2150	2160	2170	2180
2190	2200	2210	2220
2230	2240	2250	2260
2270	2280	2290	2300
2310	2320	2330	2340
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2990	3000	3010	3020
3030	3040	3050	3060
3070	3080	3090	3100
3110	3120	3130	3140
3150	3160	3170	3180
3190	3200	3210	3220
3230	3240	3250	3260
3270	3280	3290	3300
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3390	3400	3410	3420
3430	3440	3450	3460
3470	3480	3490	3500
3510	35		

LOVEGROVE & CO.,
152 N. Third St., Philadelphia.

BISSELL & CO.,
Wholesale Hardware Auctioneers,
10 Chambers and 65 Reade Sts., N. Y.

ated. We refer to the leading manufacturers and importers.

Wanted.

Partner, either active or silent, with \$25,000 cash, in an old and well-established business, manufacturing Steam, Hot-Water and Hot-Air Furnaces. The best on the market. A good opening for a pushing and energetic man.

HARRIS IRON WORKS,
149 Perry St., Buffalo, N. Y.

Wanted.—A position as Chemist in
Works; thorough practical experience in
analysis of Ores, Coals, Slags, Iron and Steel;
English good references.

room
T. ROYER, JR.,
Box 1334, Ann Arbor, Mich.

Wanted.—A position as Traveling Salesman or
Clerk, by a young man with six years' experi-
ence in the Hardware and Mill Supply store. Have had
good references on the spot. Best of reference

Address "L. M. B.,"
125 Harrison Ave., Boston, Mass.

STED.—I am about opening a New York Office for the sale of Specialties in New England on commission. My line is small. Who has a good spec. Good references and surety if desired.

— "RESPONSIBLE,"

of *The Iron Age*, 36 Clark St., Chicago, Ill

Special Notices.

ROOT'S ILLUSTRATED
HARDWARE PRICE BOOKS,

which were successfully introduced the past year, have been improved for 1885, by using extra heavy interleaving paper, with red ink lines, and by adding 84 extra unbound printed and illustrated pages pertaining to miscellaneous lines on which stocks vary, of which each house can insert such as interest them. The 230 pages, bound in the regular books, show mainly the lines on which all leading American hardware stocks agree, carefully selected in the interest of the merchant, from 211 different manufacturers, with 1574 illustrations, many of them full size. Books sent out once, charges prepaid, on receipt of the following:

PRICES:

No. 1. Each number has the name 230 printed and illustrated pages, large set 100, 6 1/4 x 9 1/4 inches. They differ only in single or double interleaving and binding. No. 1 contains 478 pages, every other leaf extra heavy writing paper, with red ink lines and down rulings, which give one fine ruled page for noting prices, in pencil, facing every printed page. Four short stubs are placed after each 10 pages, for pasting in other leaves of new goods. Strongly and neatly bound, with dark colored genuine morocco leather flexible cover and flaps, with pocket inside the cover; also dark red polished edges. Price, \$7 per copy.

No. 2. Like No. 1, but red Russia leather. Price, \$7 per copy.
No. 3. Like No. 1, but doubly interleaved, containing 478 pages, 478 of which are the extra heavy interleaving paper, with red ink lines and down rulings, which give two fine ruled pages for noting prices instead of one. The sale of No. 3 now about equals all the other numbers. Price, \$8 per copy.
No. 4. Like No. 1, but without flap or pocket. Price, \$6 per copy.
No. 5. Like No. 3, but without flap or pocket. Price, \$7 per copy.
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Old No. 2, with interleaving and without down ruling. A few copies are in stock, which will be sold out, including the 84 extra pages, at Price \$5 per copy.
Special Prices given to houses ordering six or more copies at one time.
In ordering, state if you prefer Tin, Wooden and Hollow Ware left out. If not so stated, complete books will be sent, including these lines. These Price Books are indispensable to hardware buyers, travelers and clerks, saving often \$100 to \$200 in time, and giving better satisfaction than those made in the ordinary way. Address to

T. W. ROOT, Detroit, Mich.

FOR SALE, CHEAP

20 x 48 Corliss Beam Engine. Geared.
10 x 42 Horizontal Corliss Engine.
10 x 48
12 x 48
Horizontal Tubular Boiler, 60 in. x 17 ft. Complete.
Blake Crushers. Nearly new.
English G up Lathes, New, 24 in. x 30 ft.; swings 8 in. by 22 in. in gear.
D. B. CRUCKSHANK,
243 Dyer St., Providence, R. I.

WHAT ARE YOU LOOKING FOR?

I have on hand a very large stock of New and second-hand Machinery, comprising
ENGINES, Automatic and Slide Valve,
BOILERS, Vertical and Horizontal,
STEAM AND BELT PUMPS,
STEAM-ENGINE GOVERNORS,
MACHINISTS' TOOLS,
HOISTING ENGINES,
WOOD-WORKING MACHINERY,
STURTEVANT BLOWERS.
Write and state your wants, and will send full particulars

HENRY I. SNELL, M. E.,
135 N. 3d Street,
PHILADELPHIA.
WANTED.

A situation by a Rolling-Mill Builder and Supt. of 20 years' practical experience. Has erected both Iron and Steel Mills for making Rails, Bars and Plates. Can make and furnish drawings. Can also give first-class references in every respect. No objection to going abroad. Address
"BUILDER,"
Office of The Iron Age, 53 Reade St., New York.

Any One

who will send me the name or give me such information as will lead to the sale of a Boiler Engine or mill, will receive a regular commission.

H. M. SCIPLE,

107 to 109 N. Third St., Philadelphia.

59 DUANE ST.

We have rented the above-named building in New York City for a salesroom and branch factory, and shall be glad to see all our old friends and patrons, as well as any in need of anything in our line. Dies a specialty.

THE STILES & PARKER PRESS CO.,
Middletown, Conn.

Vulcan Works Baltimore, Md.

This old-established Foundry and Machine Shop for sale or lease. Has a complete equipment in all departments. Tools for sale. Send for catalogue. Address as above.

LEIGH'S
DISCOUNT BOOK

Specially arranged for the use of the
HARDWARE TRADE.
Acknowledged by ALL the best work of the kind ever published. Price by mail ONE DOLLAR.

Address
E. B. LEIGH,
Sec'y The American Brake Co., N. J. Louis, Mo.

Wanted to Buy.

OLD CAR WHEELS, CAST BORINGS,
BURST IRON, OLD HOT BLAST PIPE, &c.,
and all kinds of Scrap Iron, in carload lots. Address, stating quantity, price, delivery, &c.,
SITES, GILL & CO.,
222, 224 So. Third St., Philadelphia, Pa.

A RARE OPPORTUNITY

For a profitable investment in a large established Manufacturing Business, centrally located in the city of Chicago, including a Machine Shop, &c., completely equipped with first-class modern tools, a full line of patterns for the best known slide-valve engine in the West; also variable and some automatic cut-off engines, and some special tools, all widely and favorably known. Desire to close out the entire business on account of falling health. Includes the good will and a long lease. A bargain and favorable terms to the right party. Address
MACHINE SHOP,
Office of The Iron Age, 53 Reade St., Chicago, Ill.

WANTED.—A Salesman to handle a line of Hardware specialties in Boston, also one for Chicago and St. Louis.
Address
"MANUFACTURER,"
Office of The Iron Age, 53 Reade St., New York.

Trade Report.

British Iron and Metal
Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, May 6, 1885.

Scotch Pig.—The market is unchanged. We quote makers' brands as follows:

Coltness, alongside, Glasgow	52/6
Langloan, "	52/6
Gartsherrie, "	50/6
Summerlee, "	50/6
Carnbroe, "	48/6
Glenarnock, Ardrossan	47/6
Eglinton, "	47/6
Dalmellington, "	45/6
Shotts, " at Leith	50/6

Lighterage from Ardrossan to Glasgow is 1/4 ton.

Cleveland Pig.—Is irregular. We continue quotations, f.o.b. shipping ports:

Middlesboro, No. 1 Foundry	36/6
" No. 2 "	35/6
" No. 3 "	34/6 @ 35/6
" No. 4 Forge	35/6

Bessemer Pig.—Is not so steady. W. C. Hematites are quoted 43/ for mixed lots, Nos. 1, 2 and 3, equal portions, f.o.b. shipping ports.

Manufactured Iron.—The market is irregular. We quote at works:

Staff, Ord. Marked Bars	7 10 0 @ 5 10 0
" Medium "	6 0 0 @ 6 10 0
" Common "	5 10 0 @ 5 15 0

Hoops, 20 W. G. and over.
" Common Best..... 6 15 0 @ 6 10 0
" Medium..... 6 5 0 @ 6 10 0
" Common..... 6 0 0 @ 6 7 6
Sheets, 20 W. G. and under.
" Ordinary Best..... 7 15 0 @ 8 5 0
" Common..... 7 5 0 @ 7 15 0
Welsh Bars..... 4 17 6 @ 5 2 6

Steel Rails.—Are unchanged. We quote £4. 15/ f.o.b. shipping ports.

Old Rails.—Are unchanged. We quote Old D. H's, c.i.f. New York, £3 @ £3. 2/6.

Scrap.—The market is unchanged. We quote Heavy Wrought £2. 10/ @ £2. 15/ c.i.f. New York.

Copper.—The market is unchanged. We quote Best Selected, £48 @ £49, and Chili Bars, £43. 15/ @ £44. 5/.

Tin.—Is a little steadier. Straits Ingots, spot, £80. 5/ @ £80. 10/, and futures, £80. 5/ @ £80. 15/.

Tin Plates.—Are irregular. We quote:
Tin Plates, 10x14, 1st qual. Charcoal..... 19/6 @ 21/6
" 2d "..... 18/6 @ 19/6
" 1st " Coke..... 17/6 @ 18/6
" 2d "..... 18/6 @ 19/6

Spelter.—The market is unchanged. We quote Ordinary, at shipping ports, £13. 17/6 @ £14.

Lead.—The market is quiet. We quote Common English Pig, £10. 12/6 @ £10. 17/6.

Freights.—Steam from Glasgow to New York, 1/ @ 2/.

Financial.

Office of The Iron Age.

WEDNESDAY EVENING, May 6, 1885.

The commonly accepted opinion of one week ago, that "war is inevitable," suddenly gave place on Monday to assurances of a peaceful solution. The speculative tendencies of the grain, provision, cotton and other markets were at once checked, but not without unusual excitement on the several exchanges. Cotton excepted, all prices were lower, with a rush to sell. In response to the decided advance in British consols and Russian securities, June wheat, which on Saturday sold at \$1.03 3/4, fell 3/4 at 3 3/4 to 99 3/4. Exporters were offered grain at a decline of fully 1 1/2 @ 2 1/2. Corn was 2 1/2 @ 2 1/4 lower at the close. Provisions were also depressed. Pork at Chicago broke 47 1/2 @ 55 1/2 barrel, and lard 10 1/2. Cotton was held 8 @ 9 points above Saturday evening. General trade must remain sluggish until the future can be more definitely forecast. The uncertainties of the course of events in Europe, upon which our own silver question is to some extent contingent, as well as the drift of foreign exchange, and the condition of the winter wheat crop, of which the agricultural report for May is likely to give important information, to say nothing of the disruption of the railway freight pool of the Eastern trunk lines—all these tend to discourage legitimate enterprise in whatever way attention may be directed. Happily, these are signs that the clouds are lifting. Among dry-goods jobbers war rumors have tended to disturb values, so that, whatever the volume of business, results are unsatisfactory. Even the hitherto most successful Southern mills are in some instances shown to be running at a heavy loss. Cotton has shown more life in all the markets, with prices firm at an advance, but exporters are doing little. As the week closes both wheat and corn are lower than a week ago, June selling down to 99 3/4, with no export demand. Wool is quiet, but steady. Spirits turpentine firmer. Hemp quiet, but firm. Hops dull, but steady. Tobacco quiet. Raw sugar dull and nominal; refined moderately active and about steady. Coffee dull and weak. Tea quiet.

The posted rates for bankers' sterling remain unchanged at \$4.87 for 60-day and \$4.89 for sight. The market is strong.

On the Stock Exchange early in the week the market was barely steady, with transac-

tions limited mainly to a few leading specialties. The varying prospects of war in Europe seemed to check operations, and the prevailing dullness was intensified by the expiration of the trunk-line pool, with no provision for a future adjustment. On Monday the more peaceful advices from abroad encouraged a bear demonstration, mainly based on lower prices for American securities and the rise in consols. Railroad disagreements in Chicago caused a heavy drop in the grangers. On Tuesday there was more irregularity, with little difference in the situation. To-day, however, there was a marked change for the better, at advanced prices throughout the list. The improvement was due partly to the covering of shorts, also to buying on London account. We quote at the close as follows:

Burlington and Quince, 121 1/4; Canada Pacific, 37 1/2; Central Pacific, 29 1/2; Lackawanna, 104 1/4; Delaware and Hudson, 79 1/2; Denver and Rio Grande, 5 1/4; Erie, 10 1/4; do., preferred, 21 1/4; Kansas and Texas, 18 1/4; Lake Shore, 54; Louisville and Nashville, 30 1/2; Michigan Central, 49; Manhattan Consolidated, 92; Missouri Pacific, 95; New York Central, 88 1/4; Jersey Central, 36 1/4; Northwestern, 92 1/2; Northern Pacific preferred, 30; Oregon Railway and Navigation, 75; Oregon and Transcontinental, 13 1/4; Pacific Mail, 54 1/4; Rock Island, 113; St. Paul, 68 1/4; Omaha, 20; Texas and Pacific, 10 1/4; Union Pacific, 48 1/4; Western Union, 58 1/4.

United States bonds closed as follows:

U. S. 3 per cents.	Bid.	Asked.
U. S. 4 1/2, 1891, coupon	107 1/2	108
U. S. 4, 1897, coupon	121 1/2	122 1/4
U. S. Currency 6s, 1895	127	—
U. S. Currency 6s, 1896	129	—
U. S. Currency 6s, 1897	130	—
U. S. Currency 6s, 1898	128 1/2	—
U. S. Currency 6s, 1899	134 1/4	—

The weekly bank statement again reflects the plethoric condition of the money market and the sluggish movement of business. Last week there was an increase of \$1,998,225 in the surplus reserve, which now stands at \$55,140,65. Meanwhile the loans were contracted \$1,727,300. The heavy disbursements on account of interest and dividends due May 1 are not fully indicated, on account of the system of averages, but the payments of railroads alone were estimated at \$18,000,000. Such defaults as occurred have been expected for some time. The Chesapeake and Ohio paid half cash and half scrip on the "B" bonds. The New Jersey Central, Reading and Lake Erie and Western defaulted. It is stated that interest on Jersey Central bonds will be paid as soon as net earnings will permit. The difficulty of finding profitable employment for money is forcibly seen in the reluctance of many of our banks to be made depositories of the city funds, subject to interest at 2 1/2. The rate of 1 1/2 % on deposits is more commonly favored. There is a good demand for commercial paper of first class, but the supply is limited. We quote 60 to 90 days' indorsed bills receivable, 3 1/2 @ 4 %; four months commission-house paper, 4 @ 5 %. The Canadian Government has succeeded in making a temporary loan in England of \$5,000,000. In Chicago the ordinary rates are 5 % @ 7 %.

The Treasury statement made public May 1 does not serve to allay apprehensions concerning the future of the currency, from the fact that the decrease of gold and increase of silver owned by the Government is going on at an accelerated ratio. January 2, 1884, the Government owned \$154,000,000 gold; January 1, 1885, it owned \$141,000,000 gold—a decrease of a little more than \$13,000,000 a month. Three months later, April, 1885, it owned \$125,000,000 of gold—a decrease of more than \$5,000,000 a month. The exact figures for a month ago were \$125,793,256. To-day the Government owns \$117,000,000 in gold—a loss in 30 days of nearly \$8,000,000. At the rate of loss for the past month, it may be doubted whether the supply of gold will last until the end of the calendar year. What effect the lessened prospects of war may have in checking the demand for gold and deferring the necessity of tendering silver in payment of Treasury obligations remains to be seen. The price of silver, which advanced fully 2 % within a month, is now quoted 49 1/2 p ounce.

The imports at the port of New York for the week were \$2,097,796 above those of the previous week. The total was valued at \$7,890,894, of which \$1,938,463 were of dry goods and the remainder (\$5,952,431) general merchandise. The total value of the imports from January 1 to date is \$132,836,711, against \$157,388,513 for the corresponding period last year. The exports of merchandise for the week are \$407,738 above those of the previous week, the total being \$6,255,308, which brings up the aggregate since January 1 to \$114,870,907, as against \$102,446,481 for the same time in 1884. Included were 97,859 barrels of wheat flour, 317,314 bushels of wheat, 705,241 bushels of corn, 11,775 bales of cotton, 9,146,085 gallons of petroleum, 4,073,991 lb cut meats and 4,366,772 lb lard. According to the Custom House reports, the imports of specie and bullion at this port for the week were \$220,000, making a total of \$5,719,170 since January 1, as compared with \$4,640,844 for the same time in 1884. The exports of specie during the week were \$343,608, mostly in silver, making a total of \$10,602,159 since January 1, against \$41,196,342 for the same time in 1884.

The quiet condition of general business is approximately indicated by the total exchanges of leading clearing houses throughout the country, which last week decreased

40 1/2 % compared with the corresponding week last year; outside of New York, a decrease of 16 %; Milwaukee, increase of 29 %; Kansas City, 26 %; Providence, 10 %; Detroit, 3 %, and San Francisco, 1/2 of 1 %. Pittsburgh, decrease of 52 %; New York, 48 1/2 %; Boston, 12 %; Philadelphia, 31 %; Chicago, 15 %; St. Louis, 10 %; Baltimore, 21 %; Cincinnati, 14 1/2 %. The aggregate exchanges for the month of April showed a decrease of 33 %; outside of New York, 11 1/2 %.

The West Shore Company have issued a circular from Chicago announcing the appointment of a Western freight agent in charge of rail and lake traffic, and solicit the west-bound business of the merchants of Chicago, Milwaukee, and the Northwest from New York, Boston and New England points.

The two Oil Exchanges, as now consolidated, have a membership of 2500.

Metal Market.

Copper.—There has been increased firmness during the week, some 200,000 lb Lake Superior selling on the spot at \$11.30—now \$11.40 asked—and 500,000 lb June, July and August delivery at 11 1/2 ¢, there being a brisk demand for futures. Meanwhile the London market for Chili Bars has also been looking up, under the favorable change in the political aspect, after they had been all the way down to £43 on the 2d inst. The price has varied as follows: April 30, £43. 2/6; May 1, £43. 5/; May 2, £43; May 4, £43. 10/; May 5, £43. 15/; and this morning, £44. 7 1/2. Best Selected, on the other hand, gave way from £49 to £48. 10/.

We quote at the close, Arizona Copper, 11 1/2 ¢ @ 11 1/4 ¢, and Baltimore, 10 1/4 ¢, the market winding up stiff. Manufacturers may be nominally quoted: Bottoms, 18 ¢; Braziers, 17 1/4 ¢; Sheathing, 16 ¢, and Bolt Copper, 18 ¢. We are cabled from London that the market is unchanged as to Chili Bars, and that Best Selected is quoted 20/ @ 30/ lower.

Tin.—In Tin the London market has also been looking up, and Straits, from £80, spot, yesterday, advanced to £80. 5/ this morning, while three months' rose from £80. 5/ to £80. 10/. Here there is more disposition to-day to take hold, and we quote Straits 18 ¢ @ 18 1/4 ¢ as to size of lot, spot. Mr. Charles Nordhaus, E. I. agent, 13 Cedar street, New York, furnishes us the ensuing April statistics of Tin:

1885.	Tons.
April 1, stock	1,600
April 1-31, imports	600
Total	2,200
Consumption April	600
May 1, stock estimated	1,600
May 1-31, imports	1,300
May 1-31, visible supply	2,900

We are informed by cablegram from London this afternoon that the market is a little steadier. Tin Plates.—The market has been featureless at the following quotations for large lots, ordinary brands, 7 box: Charcoal Bright, \$4.87 1/2 @ \$5; do. Ternes, \$4.40 @ \$4.62 1/2; Coke Tin, \$4.37 1/2 @ \$4.45, and do. Ternes nominally \$4.30 @ \$4.35. Liverpool has meanwhile been steady—Charcoal at 15/6 @ 16/6, and Coke at 13/6 @ 14/6. From London we are told that Tin Plates remain irregular.

Lead.—Consumption is fair and there has been no material falling off in the demand, some 1000 tons selling in a quiet way during the past 10 days at \$3.65 @ \$3.70 for Common Domestic, the outside figure being the closing one; Refined, 3.7 ¢. It is said that the Richmond Company wish to sell 2000 tons held here, which, until done, exercises a check on further dealings; it is not believed that the company will be willing to sell at \$3.70, but this is doubtful. Lead is in a good position, inasmuch as production has decreased a little latterly. St. Louis quotes \$3.45 for Hard, and \$3.50 for Soft. Soft Spanish advanced in London from £10. 15/ to £10. 17/6. Manufacturers are quoted as follows: Lead Pipe, 5 1/4 ¢ @ 5 1/2 ¢; Sheet Lead, 6 1/4 ¢; Tin-Lined Lead Pipe, 15 ¢, and Block-Tin Pipe, 40 ¢, allowing in trade for Old Lead delivered in New York, 3 ¢ @ 3 1/2 ¢. Shot, Drop, 6 ¢; Buck, 7 ¢; Chilled, 7 ¢. Shot in 5-lb bags, 1 ¢ @ 1 1/2 ¢ extra. Our cablegram from London states that the market is quiet, with no change in prices.

Spelter and Zinc.—The market here is more demoralized than ever, as Common Domestic has sold as low as 4 1/2 ¢. We quote the range 4 1/2 ¢ @ 4 1/2 ¢, without much prospect for an improvement just now. We quote Bertha Refined as heretofore, 7 1/4 ¢ @ 8 ¢. London remains steady, £13. 15/; Silesian, and this brand is worth 4 1/4 ¢, nominally, in New York.

Sheet Zinc.—Is unaltered and neglected at 5 ¢ @ 5 1/2 ¢ Domestic. From London we are cabled that the market is unchanged at £13. 17/6 @ £14 for Ordinary at shipping ports.

Antimony.—London gave way with Hallett from £38. 10/ to £38, and we are quiet and weak here at 9 1/2 ¢ for Hallett, and 10 ¢ for Cookson.

Coal Market.

The present dullness in the Coal trade is phenomenal. Some of those longest in business say they never knew a spring so dull—when there was so little disposition to buy. The fact is interpreted simply as an index of the general business situation. Schuykill Free-burning and most of the Hard Coals are quoted as follows, f.o.b.: Broken and Egg,

\$3.25 @ \$3.50; Stove, \$3.75 @ \$4; Chestnut, \$3.30 @ \$3.50; Pea, \$2 @ \$2.35.

The Reading Company have taken the Brooklyn elevated contract at about \$3.30, and another contract for the Brooklyn Water Department brought out several bidders, the lowest \$3.54, and thence up to \$3.80. Including costs of delivery, the bidder would net about \$3.30, as in the instance above. A circular from the Philadelphia Coal and Iron Company makes no change except an advance of 10 ¢ a ton in Hard White Ash, Broken and Egg, and 15 ¢ a ton in Free-burning White Ash Coal at Port Richmond.

The Bituminous trade is very dull, with prices ranging from \$3.25 down to \$2.85 @ \$2.90 alongside.

The Coal trade propose to form an organization within the Maritime Exchange. A circular signed by Messrs. Richmond Talbot, Abiel Abbot and Wm. H. Van Brunt, as a committee, represents that the Maritime Exchange affords every facility for the purpose at a minimum of expense. Among its 2000 members are not only the representatives of the steamship lines, but other buyers of Coal, as well as the carriers by land and sea. Under the charter and by-laws of the association, the trade can adopt its own regulations, elect its own committees, manage its own affairs, fix its hours for change, its rates for demurrage, its system of credits—in fact, organize as effectively as if by a separate Coal exchange, without its outlay, machinery and expense. The three companies interested in transporting Bituminous Coal to Buffalo have agreed to fix a minimum price at which Coal shall be sold, taking effect May 1. The rate was practically fixed by the Grand Trunk contract, which this year went at \$2.40 for Lump, \$2.35 for Lump and Nut and \$2.20 for run of mine delivered at Suspension Bridge.

The Lehigh Valley Railroad Company have commenced operations in the Snow Shoe Coal fields, capable of producing 400 tons of Coal daily, and 180 ovens have been erected for coking purposes.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, May 4, 1885.

Several of our new manufacturing enterprises which begun the construction of their works within the past year are now beginning to enter upon the market with their products, not only through the Southern States but are seeking markets in the Northern States, and those that have been erected for a number of years appear now to be taking new life, and are boldly offering their goods wherever there is a market for them, regardless of place or distance. Our railroads are realizing the importance of enabling the Southern producer to meet any market in the United States, and are giving rates accordingly. Millions of feet of lumber will this year find a market in Philadelphia, New York and Boston, and many of the interior points in the East, which will be taken by all-rail route. Cast Pipe for gas and water is now finding a market in many of the cities of the North and West as well as California, Nevada, Arkansas and Texas. Wooden butter dishes, used exclusively by retail grocers, are now being sent in carload quantities to Boston, New York and Philadelphia and many of the Western cities. The Stove works have recently increased their force largely, and they are supplying many Western points. There are five furniture manufacturers, working about 450 hands, running full and sending their product to almost every Western city. The Worden Cistern and Well Pump Works are turning out about a carload per day, which is finding a market in the West, and we might add Handle factories, Wire Fence works, Wagon Springs, Bolt and Nut works and smaller enterprises, all of which are running to their full capacity and finding a market other than local. Prices are low and profits are small, but this condition leads to economy at least, and may not prove so bad in the end.

Pig Iron.—There appears to be no change whatever in this article; all the furnaces excepting those out for repairs are running along in their usual way. It is perhaps but a little straw, but we note several offers from parties other than consumers for round lots with storage privileges; but, so far as we have been able to ascertain, the offers have been declined. This is perhaps a feeling that we are at the beginning of a rise. As an indication of prices we note the refusal of an offer for 3000 tons of good No. 1 Mill, which would have netted the furnace \$12.05 cash at the furnace, delivery to be made at the option of the furnace during the next five months from the first of the present month. All of the furnaces are well sold up, taking, however, such orders as will enable them to avail themselves of a portion of their product should prices advance. The general feeling is that prices are absolutely at the bottom and can go no lower, and that whatever change there is must be for the better. There has been the usual demand from the Southern foundries, and several round lots have been sold for Northern and Eastern points. We make no change in quotations.

Hardware.—We have no change to note in this particular line. There is an active demand for all articles in the housebuilding line and articles connected with the manufacture of lumber, but in everything else trade is dull.

Cast Pipe.—The works for the manufacture of this article have been running quite full for the past three months, but more recently have received very heavy orders and are now running to their fullest capacity. We quote them at \$25 @ \$28 1/2 ton, according to diameter of Pipe and size of order.

Scrap.—In this line we have nothing new to note. Some Old Wheels are changing hands at about \$12 @ \$12.50, and some sales of round lots of Cotton Tie Clippings have been made at 50 ¢ @ 100.

Trade Report.

New York Iron Market.

American Pig.—The volume of business has been the same as it has been for some time, nor has the character of the sales changed, small lots only being called for. While No. 1 Foundry is well taken care of, No. 2 is more abundant, and the anxiety of some sellers to place their Iron is leading to concessions of about 25¢ on fair lots. This is not, however, general, being confined to a few, the majority of the sellers of standard brands declining to entertain offers lower than those we quote. In some instances, too, Southern Iron is more vigorously pressed. We continue to quote standard brands of Lehigh and North River Irons, tidewater delivery, as follows: No. 1 X Foundry, \$18 @ \$19; No. 2 X Foundry, \$17 @ \$18; Gray Forge, \$16 @ \$17. The outside figure is asked for special brands. Outside brands sell for 50¢ @ \$1 less than our quotations.

Scotch Pig.—Arrivals foot up to about 900 tons for the week, all sold prior to arrival. A part of it was for shipment West. Nominal quotations for 5 and 10 ton lots are as follows: Coltness, \$21.50 to arrive; Gartsherrie, \$21 to arrive; Shotts, \$21.50 to arrive, \$22 from yard; Langloan, \$21.50 to arrive, \$22 from yard; Carnbroe and Glengarnock, \$19 @ \$19.50 to arrive, and \$20.50 from yard; Summerlee, \$20.50 to arrive; Dalmeilington, \$19 @ \$19.25 to arrive; Eglington, \$18 @ \$18.50 to arrive; Clyde, \$19 to arrive. For larger lots we quote, nominally, Coltness, \$21.

Bessemer Pig and Spiegeleisen.—There has been no business in foreign material. In Spiegeleisen the largest buyers in this market are very well supplied, and recent sales of American metal were lower than foreign quotations, the buyer saving lighterage. Nominally \$25.50 is quoted for 20% American Bessemer Pig is quiet, the Cornwall quotations being \$15, \$16 and \$17, respectively, for Nos. 3, 2 and 1 at furnace, with occasional shading of the first named. Other kinds are held higher.

Bar Iron.—The market continues exceedingly unsatisfactory, especially so far as Refined Bar is concerned. We quote for delivery here, in round lots: Common Iron, 1.45¢ @ 1.55¢, and Refined Iron, 1.65¢ @ 1.9¢, store prices being 1.55¢ @ 1.75¢ and 1.8¢ @ 1.9¢ respectively.

Structural and Shaped Iron.—A number of important contracts still hang fire. Angles are selling in round lots at 2¢ @ 2.2¢, the lower figure being occasionally shaded, while Tees can be purchased at 2.25¢, delivered, in round lots. Store quotations are 2.2¢ @ 2.4¢ for Angles and 2.4¢ @ 2.5¢ for Tees. American Beams and Channels are 3¢ from dock for all orders. Foreign Beams, in round lots, are quoted 2.5¢ @ 2.6¢ for Belgian, and 2.6¢ @ 2.8¢ for German. Only a small business from stock has been done.

Plates.—The demand is principally for Steel, for which fair orders are occasionally received. Usual prices of Iron Plates are as follows: Common or Tank, 2¢; Refined, 2 1/4¢ @ 2 1/2¢; Shell, 2 1/2¢ @ 2 3/4¢; Flange, 3 1/4¢ @ 3 1/2¢; Extra Flange, 4¢ @ 4 1/4¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2 1/4¢ @ 3¢ on dock; Boiler, 3 1/4¢ @ 3 1/2¢ for Shell, 3 1/2¢ @ 4 1/4¢ for Flange and 4 1/4¢ @ 5 1/2¢ for Extra Flange and Fire-Box.

Sheet Iron.—We note no improvement in the market. We quote for No. 24, Ordinary grades, in carload lots, 2.55¢ @ 2.65¢ here and 2.8¢ @ 3.8¢ from store, according to quality and finish.

Merchant Steel.—In some quarters it is reported that the sales in April were considerably larger than those of previous months. Quotations for the range from Ordinary to Good grades are as follows: American Tool Steel, 7 1/2¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2 1/2¢ @ 3¢; Open-Hearth Machinery, 2 1/4¢ @ 3 1/4¢, and Bessemer Machinery, 2 1/2¢ @ 2 3/4¢; English Tool, 1 1/2¢ @ 1 5/8¢.

Steel Rails.—In the aggregate sales of about 20,000 tons have been made, including the Union Pacific contract, which has been in the market for a long time. Since the majority of the business was based upon prices at point of delivery—the special rates of freights generally accorded are unknown—it is difficult to state positively what the net prices at mill were. We quote \$26.50 @ \$27. The burning of the new mill of the Lackawanna Coal and Iron Company forces that company to roll their rails at the old mill, located at some distance from the converting department. This practically reduces their capacity one-half, and, so far as competitive business is concerned, puts the company out of the market for the next six months. The North Chicago Company are stopped for a strike, and the Joliet Works are not working, owing to current repairs. These facts would point to some possibility of an improvement.

Steel Wire Rods.—We hear of no new business, though the spot Rods that have been pressing on the market are not entirely cleared away. It is urged by importers that the German mills cannot sell at prices low enough to enable current prices to be met. On the other hand, it is not denied that the German works look upon this market as

affording an outlet for their surplus which will enable them to obtain more remunerative figures at home. We quote nominally \$39.50 @ \$40.

Old Rails.—There have been no transactions worthy of being put on record, and the market is very dull. We quote, nominally, \$16.50 @ \$17.

Scrap.—We quote, nominally, \$18.75 @ \$19 from yard.

Rail Fastenings.—Quotations for large lots are 2.6¢ @ 2.65¢ for Bolts and Square Nuts; 2.75¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.6¢ @ 1.7¢ for Splice Bars. Railroad Spikes are quoted 1.8 @ 1.9¢.

G. W. Jones & Co., Pig Iron and Old Material, have removed to 56 Wall street.

Philadelphia.

Office of The Iron Age, 230 South Fourth St., PHILADELPHIA, May 5, 1885.

Pig Iron.—The month opens on a dull and apathetic market, and with the average of prices barely up to what they were four or five weeks ago. Quotations are unchanged and some brands are steady, but there are more weak spots in the market, and large consumers have placed orders for Mill Irons and No. 2 Foundry at less money than they have paid heretofore. There is no general decline, however, and concessions have not been more than 25¢ @ 50¢ per ton, and even then the quantity taken was of considerable importance—1000 tons each or more. Apart from these special transactions the market may be called dull and steady. No. 1 Foundry is in moderate supply, but prices have been maintained, and if there has been any shading it was because of uncertainty as to quality or other considerations of a special character.

On the whole, the outlook cannot be called encouraging, but there is no reason to expect any general change in prices, although buyers of large lots are likely to find the market in their favor, especially on the lower grades. Meanwhile the feeling is to limit transactions to actual requirements, so that the majority of sales have been in small lots at \$16, \$17 and \$18, delivered, with the usual addition of 50¢ @ \$1 per ton on special brands. Alabama Irons are still available at \$15, \$16 and \$17, ex-ship, but there is no demand at those figures, so that sellers are not urging business, as there is little chance of acceptable orders being made in the present condition of the market.

Foreign Iron.—Nothing doing; prices nominally \$19.25 @ \$19.50 asked for Bessemer, and \$26 for 20% Spiegeleisen.

Muck Bars.—Prices are steadily maintained for good qualities, although the demand is not active. Sales as low as \$26 for some makes, but \$27 @ \$27.50 is usually quoted for the best makes.

Blooms.—The market is fairly active on Steel Blooms at about last week's prices, say, Soft Basic Blooms at from \$33.50 to \$35, Billets from \$38 to \$39, and Siemens-Martins at from \$40 to \$42. Domestic Blooms are quoted at from \$30.50 to \$32, delivered, for Nail Plate, and \$35 @ \$36 for Plate and Sheet Blooms. Other descriptions are extremely dull, and prices almost nominal, as follows: Charcoal Blooms at \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$35 @ \$36; Northern Ore Blooms, \$35.

Bar Iron.—The demand for small lots is moderately well sustained, but the feeling is one of extreme depression, nevertheless. Sales have been made during the week at lower prices than ever, and on anything like a good-sized lot buyers appear to almost make their own figures. Some are of opinion that the prospect of labor trouble in the West will help the market a little, and there are inquiries already which appear to confirm that view. There is a very uneasy feeling, nevertheless, and prices range all the way from 1.5¢ to 1.8¢, with the majority of transactions at medium figures. Orders for Skelp Iron were given out somewhat liberally during last month, and some of the mills are quite busy on that class of work, although at low prices.

Plate and Tank Iron.—The demand has shown no improvement, and sales have been confined almost exclusively to small lots. Inquiries for good-sized lots that were on the market during last month have not yet resulted in business, so far as this market is concerned, but it is not improbable that mills further west have secured the orders. Meantime prices are about as last quoted, viz.: Ordinary Plate, 2¢; Tank, 2¢ @ 2.1¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Flange, 3.5¢ @ 3.75¢; Fire-Box, 4¢ @ 4.25¢.

Structural Iron.—No new features have been developed, and the market is as dull and uninteresting as ever. An order for some 800 tons for an Iron pier to be built at Atlantic City will probably be placed this week, but apart from that everything is of a hand-to-mouth character. Prices unchanged, as follows: 2¢ @ 2.1¢, delivered, for Angles, 2.1¢ @ 2.15¢ for Bridge Plate, 2.3¢ @ 2.4¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There is a moderate amount of business coming in, but prices are very unsatisfactory, and, although tolerably firm, no one seems to have courage to ask an advance. Small lots about as last quoted, say: Best Refined, Nos. 26, 27 and 28, 3 1/2¢; Best Refined, Nos. 18 to 25, 3 1/4¢; Common, 3 1/2¢ less than the above. Best Bloom Sheets, Nos. 26 to 28, 5¢; Best Bloom Sheets, Nos. 22 to 25, 4 1/2¢.

Best Bloom Sheets, Nos. 16 to 21, 4 1/2¢; Blue Annealed, 2 1/2¢; Best Bloom, Galvanized, discount, 60¢; Second quality, discount, 62 1/2¢; Common, discount, 65¢.

Wrought-Iron Pipe.—There is no special change to notice, but the tendency is toward improvement, both in price and demand. There is still a good deal of irregularity, however, but prices generally are about as last quoted for ordinary-sized lots, say: Butt-Welded Black Pipe, 45 @ 47 1/2¢; Lap-Welded Black, 65 @ 67 1/2¢; Butt-Welded Galvanized, 35 @ 37 1/2¢; Lap-Welded Galvanized, 45 @ 47 1/2¢; Boiler Tubes, 57 1/2 @ 60¢.

Steel Rails.—Business is quiet, but there are sufficient orders to keep the mills full of work during the summer months, and in some cases beyond that time. Prices are steady and unchanged at \$27.50 for 56's and \$29.50 for 35's, with occasional slight concessions on large lots or convenient deliveries. The tone of the market is healthy, and manufacturers seem to expect better prices in the near future.

Nails.—The demand has not been as large as was expected, but is improving. Prices from first hands are firm, and there is little doubt that the quotation will be held at \$2.30. At a meeting of the Eastern Nail Association held here last week the card rate was reaffirmed and a resolution adopted to close the mills two weeks prior to the 1st of July, each mill to select its own time for suspension, but all agreed to close for two weeks.

Old Rails.—The market is extremely dull; no sales whatever have been reported within the past three or four days. Spot lots are held at \$18, Philadelphia, but buyers hold off and consider \$17 @ \$17.25 about their ideas of value. At points within a radius of 100 miles, sales could be made at \$18.25 @ \$18.50, but buyers are evidently expecting lower prices, and are extremely cautious in making firm offers for any but small lots for immediate delivery.

Old Material.—The demand is less active, and prices hardly as firm as they were a week ago. We quote as follows: No. 1 Wrought Scrap, \$15 @ \$19; No. 2 do., \$12.50 @ \$13.50; Horse Shoes, \$22.50 @ \$23; Turnings, \$13.50 @ \$14; Old Car Wheels, \$15.50 @ \$16; Old Steel Rails, \$15.50 @ \$16; Fish Plates, \$22.50 @ \$23; Cast Scrap, \$13.50 @ \$14; do. Turnings, \$9.50 @ \$10.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., May 5, 1885.

There has been little or no change in general business the past week. The cold weather of the past few days has been discouraging, as it has given a back-set to vegetation; but as there was no freezing or frost, but little damage was done to the growing crops. It may be well to state in this connection that the reports in regard to the winter wheat have been exaggerated, at least in some localities, and, while there is no getting over the fact that there will be a shortage as compared with the crop of last year, it is true that the deficiency will not be so great as good many writers are apparently anxious to have it. Manufacturers generally are watching the crop reports with a good deal of interest, realizing that these exert a great influence on business. That business is dull here is evident from the statement that there are about 1000 vacant houses in Pittsburgh, Allegheny and vicinity. This is one of the effects of so much unemployed labor; families are doubling up, two, and in some instances half a dozen, families occupying one house, being unable to pay the rents they formerly paid. The effect of this is to restrict the construction of new buildings.

In regard to the labor situation there has been no important change the past week. The conference committees of the manufacturers on the one hand and the Amalgamated Association on the other have come to no understanding as yet, and what the result will be is one of those things very hard to foretell. The Amalgamated Association desire to renew the present scale, but the manufacturers ask for a reduction, and say that unless it is made they will close up their mills.

Iron Ore.—Continues much the same as noted from week to week for some time past. Trade is about as dull as ever, and no improvement can be looked for as long as there are so many idle furnaces.

Pig Iron.—The market continues in an exceedingly unsatisfactory condition. Instead of getting better, it appears to be growing worse, so far as relates to the selling interest. But very few furnaces can sell Pig Iron at present prices without losing money. One of the most discouraging features at the present time is that there are holders whose financial necessities compel them to realize, as it is their only way of raising funds to meet pressing obligations. There is still a good deal of hypothesized Iron, some of which is being pressed; it is estimated that there are from 25,000 to 35,000 tons of this Iron held by banks, insurance companies and individuals taking it as collateral for money. Notwithstanding the extremely low prices now ruling, there is considerable Iron being offered from a distance; some of it is being pressed. Sales of this hypothesized Iron are being made at from \$14 to \$14.50, cash, for Neutral Forge, as to brand and quality. Quotations may be fairly given as follows:

No. 1 Neutral Forge, \$15.25 @ \$15.35, 4 mos.
No. 2 Neutral Forge, \$14.75 @ \$15.00, 4 mos.
All-Ore Forge, \$16.00 @ \$16.50, 4 mos.
White and Mottled, 14.00 @ 14.50, 4 mos.

No. 1 Foundry, 17.00 @ 17.50, 4 mos.
No. 2 Foundry, 15.50 @ 16.00, 4 mos.
Bessemer Iron, 17.50 @ 18.00, 4 mos.
We can report sales of Cold-Blast Charcoal at \$26, cash, and Warm-Blast Foundry at from \$22 to \$24. Bessemer has been sold as low as \$17, cash.

Muck Bar.—Continues exceedingly dull, and there is not enough doing to establish quotations. We quote nominally at \$26 @ \$26.50, cash.

Manufactured Iron.—The demand continues light, and there appears to be but little prospect of any immediate improvement. Heretofore, with a prospect of a strike in June, April and May have always been good months, but not so this year. Some of our mill men say that in all their experience they never knew the Iron business to be worse, as, in addition to an exceedingly light demand, prices are unremunerative. Steel continues to largely supplant Iron for many purposes.

Nails.—The Iron Nail trade continues dull and prices weak. While makers generally are holding in carload lots and upward for \$2.05, 60 days, 2¢ off for cash, they have been sold as low as \$2, and more are offered at same price. Some makers quote Steel Nails 10¢ per keg above the price of Iron, but large buyers, it is said, refuse to make any difference. In regard to the merits of the two Nails there is a difference of opinion; some people allege that for most purposes the Iron is just as good as the Steel article, and, as it costs less, can be sold for less. Chess, Cook & Co. have purchased a site a few miles up the Monongahela River, of 13 acres, upon which they will shortly commence the erection of a Bessemer Steel plant. When completed they will commence to make Steel Nails. It is their intention to make their own Steel Slabs. At present Shoenberger & Co. are the only firm in Pittsburgh making Steel Nails. The regular meeting of the Western Nail Association takes place at Columbus to-morrow week.

Wrought-Iron Pipe.—The Pipe trade, like all other branches of the Iron business, continues in an unsatisfactory condition; orders are few and far between, and competition is sharp and prices unremunerative. As there is no combination, each firm is free to do pretty much as it pleases. Prices are still quoted as for some time past, although for a desirable order a slight cut might be made, as some manufacturers are said to be very anxious for business. Discount on Black Butt-Welded Pipe, 1 1/2-inch and smaller sizes, 50¢; on Galvanized do., 40¢; on Black Lap-Welded Pipe, 1 1/2-inch and larger sizes, 67 1/2¢; on Galvanized do., 40¢. For Selected Pipe, or Pipe cut to specified lengths, discount 5% less than the rates above quoted. Discount on Boiler Tubes, 60¢; 2-inch Oil-well Tubing, 10¢ per foot, net; 5 1/2-inch Oil-well Casing, 36¢ per foot, net.

Steel Rails.—There have been no sales reported here recently, in the absence of which we continue to quote Heavy Sections at \$27, cash, at mill. The above quotation might be shaded on a desirable order, of which there are but few offering. The outlook as regards this important interest continues discouraging, but there may be a change for the better later on in the season.

Old Rails.—We can report sales within the past week of Old Iron Rails at \$19.50, cash, which appears to be the ruling price; sales have also been made at same price for delivery at Youngstown. Old Steel Rails may be quoted at \$17 @ \$17.50, according to lengths—some selected lots brought for a special purpose as high as \$18.

Steel.—Best brands of Refined Cast Steel, 8 1/2¢; Crucible Machinery, 4 1/4¢; Open hearth and Bessemer do., 3¢; Steel Nail Slabs, \$29 @ \$30 per ton, delivered. The production is likely to be increased considerably within the year.

Railway Track Supplies.—There is an occasional inquiry, but, so far as we can learn, few orders are being placed here, and it is fair to infer that buyers can do better elsewhere. Spikes are still quoted at 1.9¢, delivered; Splice Bars, 1.6¢ @ 1.7¢; Track Bolts, 2.4¢ @ 2.5¢ with Square and 2.65¢ @ 2.75¢ with Hexagon Nuts.

Crop Ends.—The supply of new Rail Ends continues very meager in this market, and there is some considerable inquiry; may be quoted in the absence of sales at \$18.50 @ \$19; Bloom Ends quoted at \$17.75 @ \$18.25.

Scrap.—The demand for all kinds of Scrap is less active, and prices are easy, but unchanged. No. 1 Wrought is quoted at \$17 @ \$18 per ton—latter figure for Selected: Wrought Turnings, \$13 @ \$15; Old Car Axles, \$24 @ \$25; Cast Borings, \$11 @ \$12, gross; Old Car Wheels, \$16 @ \$17; sales reported of 100 tons Old Car Wheels at \$17, gross; 50 tons Old Car Axles, \$24.50, net ton, and 150 tons No. 1 Wrought at \$18.

Coke.—Blast-Furnace Coke remains unchanged at \$1.20 per ton, free on cars at ovens.

Window Glass.—The demand continues light, but is expected to improve in the near future. No change in prices. Discounts as follows: Single Strength, 70 and 10% for car lots; on Double Strength, car lots, 75 and 5%.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, May 4, 1885.

Hardware.—In reviewing the market for the past week and drawing a comparison with the earlier portion of the month, it shows somewhat above the average in de-

mand and shipment. Comparing the month of April with the same time last year, it is found that trade in tonnage has been heavier, and that the aggregate sales foot up in dollars and cents equally as well. Jobbers appear well satisfied with the results, as the decline in price that occurred during the last year made the sale of more goods necessary to reach the same footing, which has given them a more regular and active trade, and a margin of profit on a larger quantity of goods, but in some cases a trifle less on special lines. As the present period is looked upon as being about the middle of the season, jobbers are drawing conclusions that the trade to follow will be as good as they have had during the past month, if not better. Prices continue fairly steady, though there is the usual amount of cutting and concessions, but always for some special purpose, as reported by salesmen. This, together with the decline in the price of Nails, has had the effect of making buyers more conservative and reduced the quantity of their orders some during the past week. While we note prices as being steady, there are indications that the market is not strong, and that similar concessions to that on Screws may be expected on a number of lines before the close of the month. The principal trade has been in Steel Goods, such as Shovels, Spades, Hoes, Forks and Garden Rakes, with some call for Scythes and Snathes. Shelf Hardware, Heavy Hardware and Carriage and Wagon Material are in good request, while there has been less demand for Railroad Supplies during the week.

Barb Wire.—The demand for Barb Wire continues very good in small lots. Car-lot buyers have diminished in number so rapidly during the past two or three weeks that there are now very few calls for delivery in lots of this quantity. Through concessions made by some of the jobbers in this city quotations on Barb Wire are changed as follows: On Painted Wire, Four-Point Cattle Wire, 3 1/4¢; Four-Point Hog Wire, 3 1/4¢; Two-Point Cattle Wire, 3 1/4¢; Two-Point Hog Wire, 3 1/4¢, with 1¢ additional added for Galvanized, and 1¢ off for carload lots. This change reduces Four-Point and Two-Point Cattle Wire 1/4¢, leaving the other the same as quoted last week. Lower prices still are quoted in other localities, and, in fact, some of the quotations are so low that a second thought will convince jobbers and consumers that there exists an error made either by the writer or the printer. A quotation from St. Louis announces 2 1/2¢ on Two and Four Point Cattle Wire, when upon close observation it will be discovered that the Plain Rods cost more money, which makes the quotation absurd, at least.

Nails.—In following up the remarks of a week ago, we are now in the midst of a distracted market on Nails. Rumors of all sorts of low prices have been circulated during the week, and in summing them up we find that Iron Nails are quotable at prices which cannot be relied upon for all buyers. While there are jobbers in the market who claim that they are getting \$2.25 in small lots and \$2.20 in carload lots, there are others who are selling at \$2.15, regardless of quantity. Steel Nails continue to be quoted at \$2.25 in small lots and \$2.20 in carload lots. The usual discount is allowed on both Iron and Steel Nails in carload lots. It is also reported that Steel Nails have been sold at \$2.15 in carload lots, but the seller and buyer remain in the back ground and have not been found. The breaking of the market on Iron Nails is one that will have a serious effect upon all classes of trade and has already been felt throughout the West. When the price was first advanced many of the retail dealers loaded themselves up with stock (the greater portion of which they have yet on hand, under the belief, founded on the assertion of manufacturers and jobbers, that prices would undoubtedly go higher and remain firm during the entire season. Since then many of the large buyers have obtained their stocks, and within the last three or four weeks, there has been a gradual tendency toward weakness in the Nail market, and from that time up to the present day they have been lamenting their purchase, and, in the present condition of the market, are strenuously objecting to the action of manufacturers of Iron and Steel Nails, which compels them to sell their stock at less than it cost them. This position of the market is consequent upon the inability of the manufacturers of Iron and Steel Nails to agree upon a price that would equalize trade, as the Steel Nails have the preference at the price at which they were selling. The stocks of Iron Nails accumulated rapidly until manufacturers had loaded themselves with quantities which they deemed beyond their carrying power, and are now dumping them upon the market at any price they can obtain. A number of reasons are assigned for unloading, but the most plausible one seems to be the probability of Steel Nails superseding the Iron. Dealers, at least, are demanding the Steel Nail because it sells more readily.

American Pig Iron.—The Pig-Iron market has been fairly satisfactory when other branches of trade are considered. The greater amount of trade consists of carload orders, though there are buyers in the market of from 500 to 1000 ton lots, and several contracts for the latter have been closed during the week. While the market possesses elements of steadiness, there is nevertheless underlying these facts a weakness in price which crops out with every new venture to sell. From circumstances which

Trade Report.

General Hardware.

With the advance of the season there are indications of an improvement in general trade, and a good many goods are moving in a quiet, regular way. There are few changes in price to be noted.

BARB WIRE.

The demand for small lots is fairly good. Business among the mills is irregularly distributed, some of them being quite well supplied with orders, while others are anxious for work. We quote carload lots, Four-Point Galvanized Barb Wire 4.65 cents to 4.75 cents, and small lots 4.9 cents to 5 cents.

NAILS.

A good deal of complaint is made in many quarters of the great dullness in the market, and only a few profess to see the signs of any better condition. Some of the smaller Eastern mills, and to some extent representatives of Western works, have made some very low offers even in the past few days for carload lots, delivered in New York, which, even taking into account the cartage necessary and the inconvenience of not being able to draw from store as requirements of the purchaser call for, are lower than our nominal quotation. The representatives of the stronger concerns are unwilling to meet these prices, and are demanding the full card, withdrawing all concessions made previous to the meeting. It appears, however, that the causes of weakness above alluded to have not yet spent their force. The next few days must teach whether they are likely to continue.

The action taken by the Atlantic States Nail Association in deciding to stop two weeks during the period between May 1 and July 1 was the only measure which could prevent a decline if the demand continued as slack as it has been. It is a question, even, whether that measure will prove vigorous enough. A few figures will illustrate the position. The works belonging to the association make, say, 240,000 kegs of Nails per month when running full, as they have been doing lately. Two weeks' stoppage would therefore reduce the supply about 120,000 kegs. This is a liberal estimate, since it is usual during periods of stoppage to make repairs and get everything ready for a vigorous run, and because some of the mills have not run full time. Now, the stock on hand on May 1 is estimated at not less, and probably was more, than 350,000 kegs. We have already explained that this is not so heavy as might at first appear, because practically the makers and their agents are carrying the great bulk of the stock in the country, dealers, jobbers and retailers having but little. It is evident, on the other hand, however, that there is an ample supply, since the effect of the stoppage will simply be to tend to stop a monthly accumulation at the past rate. The manufacturers have wisely applied a check upon production at a time when it was getting dangerously unwieldy. If the volume of business in the next two months is only equal to that of March and April, the trade may take the entire current make. Any improvement beyond that might cause drawing on stocks, provided the quantities marketed in the East by Western mills do not show an increase. It has been urged that it would have given evidence of greater determination on the part of the makers if they had appointed specific weeks, since the fact that every mill is allowed to choose its own time will tend to make the restriction smaller in reality than it looks on its face. On the other hand, it is held that such rigid measures would have made it impossible to obtain general adherence to the plan. We quote carload lots nominally \$2.15 to \$2.20 for Iron Nails, while store prices are unchanged. The condition of the Nail market in Pittsburgh, Philadelphia, Chicago and other points is reported elsewhere.

SCREWS.

The American Screw Company, Providence, R. I., issue a discount sheet, under date of May 5, in which the following advanced prices are announced on Wood Screws:

Iron, Bright, Flat Head.....discount 80&5 %
Iron, Bright, Round Head.....discount 75&10 %
Iron, Blued, Flat Head (add 2½ % to net amount of invoice).....discount 80&5 %
Iron, Blued, Round Head.....discount 75&10 %
Brass, Flat Head.....discount, 75&10 %

Continental Flat Head remain unchanged at discount 85 per cent., and Round Head Brass at discount 75 per cent. The Union Steel Screw Company have taken similar action, making the discount on Flat Head Iron Screws 85 and 5 per cent., their list being, it will be remembered, the same as that used by the Russell & Erwin Mfg. Co. The other companies have not made any announcement of advanced quotations, but there are reported indications of a disposition slightly to stiffen prices. It is regarded, however, as difficult to give the market a better tone while the discount of 90 per cent, or a discount approximating it or equivalent to it is made by some of the companies. The Russell & Erwin Mfg. Co. continue selling to the extent of their production in strict accordance with the terms of their circular, and are endeavoring to supply their customers with such Screws as are ordered for their current wants, showing, however, no disposition to accept speculative orders or to stock up the customers of other

companies at present extremely low prices. The companies who have not met the discount of 90 per cent. report that they are booking a good many orders where parties desire to secure the goods at specified prices, and a good many Screws have been sold from stock at circular rates where the Screws are wanted at once.

SCYTHES.

Owing to the large production of these goods and the competition that exists between the manufacturers, Scythes are sold at very low prices, and in many cases the makers say for less than cost. The following are the list prices of Blood's Scythes, which are manufactured by H. Knickerbocker, Balston Spa, Saratoga County, N. Y., for whom John H. Graham & Co., 113 Chambers street, New York, are agents; the list is subject to a discount of \$3 per dozen on Grass Scythes and \$4.50 per dozen on Grain Scythes, and 5 per cent. discount for cash:

	Per doz.
Blood's Champion Grass Scythes, German Steel, Beaded, Painted.....	\$8.35
Blood's Champion Grass Scythes, German Steel, Half Set, Oiled or Painted.....	8.35
Blood's Champion Grass Scythes, German Steel, Full Set, Oiled or Painted.....	8.35
Blood's Champion Grass Scythes, German Steel, Waldron, Oiled or Painted.....	8.35
Blood's Champion Grass Scythes, Cast Steel, Half Set, Oiled or Painted.....	9.35
Blood's Champion Grass Scythes, Cast Steel, Full Set, Oiled or Painted.....	9.35
Blood's Champion Grass Scythes, Silver Steel, Half Set, Oiled or Painted.....	9.50
Blood's Champion Grass Scythes, Silver Steel, Full Set, Oiled or Painted.....	9.50
Blood's Champion Grass Scythes, Silver Steel, Waldron, Oiled or Painted.....	9.50
Blood's Champion Grain Scythes, German Steel, Beaded, Painted.....	12.25
Blood's Champion Grain Scythes, German Steel, Full Set, Oiled or Painted.....	12.25
Blood's Champion Grain Scythes, German Steel, Waldron, Oiled or Painted.....	12.25
Blood's Champion Grain Scythes, Cast Steel, Full Set, Oiled or Painted.....	13.00
Blood's Champion Grain Scythes, Cast Steel, Waldron, Oiled or Painted.....	13.00
Blood's Champion Lawn Scythes, German Steel, Waldron, Oiled or Painted.....	8.85
Blood's Champion Lawn Scythes, Cast Steel, Waldron, Oiled or Painted.....	9.35
Blood's Champion Brush Scythes, German Steel, Beaded, Painted.....	9.10
Blood's Champion Bramble Scythes, German Steel, Half Set, Painted.....	9.10
Blood's Young America Grass, Extra Fine, Copper Bronzed, Sharp, in Straw Bundles.....	9.10
Blood's Excelsior Grass, Red Rover Pattern, Gold Bronzed, Sharp, in Straw Bundles.....	9.35
Blood's German Clipper Grass, Extra Fine, Gold Bronzed, Sharp, in Straw Bundles.....	9.85
Blood's Silver Clipper Grass, Extra Fine, Polish Web, Gold Bronzed, Sharp, Boxed.....	9.85
Blood's Red Rover Grass, Flat Bottom, Painted Red, in Straw Bundles.....	9.50
Blood's Granger Grass, Half Set, Bronzed, in Straw Bundles.....	9.10
Blood's Centennial Grass, Half Set, Varnished, either American or Waldron Pattern.....	8.35

The prices of the Scythes of other manufacturers are represented by the following list, which is subject to a discount of 40 per cent.:

	Per doz.
Clipper Grass Scythes, Sharp and Boxed.....	\$11.50
Grass Scythes, in Straw, Not Sharp.....	10.50
The Solid Steel Scythe.....	11.00
The Colby Scythe, manufactured of the finest material.....	10.50
The Concave Leader, a superior Grass Scythe, Full Polish on both sides.....	9.75
Double Refined Cast Steel Razor Blade Grass Scythes.....	9.50
Double Refined Cast Steel Clipper Scythes.....	9.00
Double Refined Cast Steel Rattler Scythes.....	8.50
Double Refined Cast Steel Damascus Blade Scythes.....	8.50
The above Grass Scythes all Sharp and Boxed.....	7.66
German Steel Grass Scythes, in Straw.....	8.22
Brush Scythes, in Straw.....	8.22
Bramble Scythes, in Straw.....	8.22
Lawn Scythes, Sharp and Boxed, Clipper style.....	9.00
Lawn Scythes, Painted Green, in Straw.....	7.66
Imperfect Grass Scythes.....	6.00
Imperfect Grain Scythes.....	7.00

ITEMS.

F. W. Moss, 83 John street, New York, long and favorably known to the trade, under date May 1 advises the trade that he has appointed Newton & Shipman general agents for the United States for the sale of his goods, with whom he has placed on consignment at the above address, which is just opposite the old stand, a full line of the "F. W. Moss" and "Moss & Gamble's" Steel Files, Hammers, Tools, &c., intimating that he will carry with them a stock which shall be ample for all the requirements of the trade. Mr. Moss refers to these gentlemen as having been in his employment for a number of years and thoroughly acquainted with the details of his business, and well and favorably known to his customers. By this arrangement Mr. Moss will be enabled to divide his time between this country and England, thus coming frequently into personal contact with his customers on this side of the water, and at the same time spending a considerable portion of each year in England, when he will have an opportunity of visiting the factories and looking after the interests of his house in Sheffield. James S. Watson & Son, who has for so many years acted as agent for the sale in Philadelphia of the goods of F. W. Moss, will continue to do so and carry a complete assortment of the same.

Announcement is made to the Hardware trade that Hussey, Binns & Co., manufacturers of Shovels, Spades and Scoops, Pittsburgh, Pa.; Wm. Mann, Jr., & Co., manufacturers of Axes and Edge Tools, Lewistown, Pa., and the North Indianapolis Cradle Works, manufacturers of Grain Cradles and Snaths, North Indianapolis, Ind., have opened a branch office and salesroom at 97 Chambers street, New York, where they will be represented by Edward A. Bolmes, who will be in charge as manager. Mr. Bolmes, who has a wide acquaintance in the trade, also announces that he has renewed his former arrangements with Durrie & McCarty, and will continue to represent their lines and devote his personal attention to orders with which he may be favored.

The following communication has been received for publication and will put our city readers on their guard:

26 WARREN STREET, NEW YORK, MAY 5, 1885.

To the Trade: Having yesterday discovered an unsuccessful attempt on the part of

some swindler to obtain goods by forging an order upon one of our "memorandum headings," which in some way or other he had procured, we beg to advise the trade that all orders issued by us are made out upon regular "order sheets," bearing special number, and are signed by the firm, and we caution our friends against delivering any goods upon orders purporting to be from us unless satisfied as to genuineness of both order sheet and signature.

McCoy & SANDERS.

W. R. Ostrander & Co., 21 and 23 Ann street, New York, have issued a revised catalogue for their line of Speaking Tube Hardware, covering Speaking Tubes, Elbows, Mouth Pieces, Bell Alarms, &c., and Bell Hangers' Hardware, Electric Supplies, Pneumatic Call Bells and Oral, Electric, Mechanical and Pneumatic Enunciators. This list evidences the enterprise of the house that issues it, as it contains many new articles and is materially enlarged. It comprises four systems—Speaking Tubes, Mechanical Bells, Electric Bells and Pneumatic Bells—and in its arrangement the goods required for each system are found under its proper head. This advantageous arrangement, which saves trouble in hunting for possible goods

required under another head, has necessitated the changing of some of the numbers of the goods, and the manufacturers therefore request that all previous catalogues may be destroyed.

The advertisement on page 16, in which the Manhattan Hardware Company, Reading, Pa., make announcement of their prices, will receive the attention of the trade, and especially the notice that relates to an extra discount on purchases from their stock on hand prior to removal.

The copartnership heretofore existing under the firm name and style of the New England Specialty Company, North Easton, Mass., has been dissolved, and the business will be continued under the same name by Augustus J. Leavitt. The line of manufacture covers Screw Drivers from 1½ inches for sewing machine to 10 inches for Hardware trade; also Cotton Mill supplies, such as Spinning Levers, Frame Stirrups, Shuttle Springs, Bobbin Catches, &c. They refer especially to Leavitt's "Common Sense" Can Opener, which is patented by Mr. Leavitt as an article of which they are making large quantities. The special feature of this article is the lip resting on and projecting

over the edge of the can, thereby holding the cutting edge of the knife firmly to the edge of the can and cutting the end full size.

The National Horse Nail Company, Vergennes, Vt., for whom Durrie & McCarty are agents, 97 Chambers street, New York, issue a circular of their Champlain Horse Nails, containing the list prices and other information with reference to the goods.

The Atlanta Rubber Company, Atlanta, Ga., issue a circular giving the list prices of Belting, Hose and the line of India Rubber goods adapted to mechanical purposes which they handle.

J. H. Brown & Co., manufacturers of Hog Rings and Hardware Specialties, have removed their place of business from Ottawa, Ill., to 229 Lake street, Chicago.

Ewald Over, Indianapolis, Ind., issues a circular describing Burton's Improved Ditching Plow and Road Grader, in which the construction of this implement and its utility and advantages are explained.

The firm of William Wachs & Brother, Covington, Ky., has recently been changed to Wachs Brothers & Co., who will continue the manufacture of their Improved Roaster and Baker.

STANDARD BRASS GOODS.

List of Plumbers' Brass Work.

GROUND KEY WORK.

SIZE.	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Rough Plain Bibbs.....	Per dozen	9.00	11.00	14.00	16.00	21.00	32.00	52.00	72.00	150.00	230.00	300.00	
Finished Plain Bibbs, screwed for wood.....	Per dozen	11.00	13.00	15.00	18.00	24.00	36.00	60.00	84.00	170.00	270.00	360.00	
Finished Plain Bibbs, Flange and Thimble.....	Per dozen	19.00	24.00	28.00	34.00	40.00	50.00		68.00	94.00	135.00		
Finished Plain Bibbs, Flange, Nut and Bent Coupling.....	Per dozen		29.50	38.00	50.00								
Finished Tray Bibbs.....	Per dozen	13.00	16.00	20.00	26.00	38.00							
Finished Tray Bibbs, Flange and Thimble.....	Per dozen	30.00	35.00	40.00	42.00	55.00							
Finished Tray Bibbs, Flange, Nut and Bent Coupling.....	Per dozen		30.50	40.00	52.00								
Finished Bath Bibbs.....	Per dozen	29.00	37.00	40.00	45.00	59.00							
Finished Bath Bibbs, Flange and Thimble.....	Per dozen		34.50	47.00	66.00								
Finished Bath Bibbs, Flange, Nut and Bent Coupling.....	Per dozen		34.50	47.00	66.00								
Rough Stops, T or Lever Handle Nut and Washer.....	Per dozen	6.5	8.50	11.50	14.50	18.50	37.00	45.00	62.00	105.00			
Rough Stops, T or Lever Handle, Round Way, N. & W.....	Per dozen	7.00	9.00	12.00	15.00	19.00	28.00	46.00	64.00	110.00	250.00	350.00	
Finished Stops, Lever Handle.....	Per dozen	10.50	12.50	15.50	18.50	25.00	37.00	62.00	86.00	175.00			
Shower Stops, Finished Flange and Handle.....	Per dozen		34.00	42.00	50.00	60.00							
Hydrant Cocks, Nut and Washer.....	Per dozen		13.50	15.50	20.00	30.00							
Hydrant Cocks, Round Way.....	Per dozen		14.00	16.00	21.00	33.00							
Rain Cocks.....	Per dozen	10.00	12.00	15.00	19.50	30.00	50.00	90.00	130.00				
Rain and Well-Water Cocks.....	Per dozen				50.00	70.00	84.00	100.00	200.00				
Corporation Cocks, Cement Pipe, with Coupling.....	Per dozen	15.00	18.00	22.00	32.00	50.00	100.00						
Corporation Cocks, Iron Pipe, with Coupling.....	Per dozen	16.00	19.00	23.00	34.00	53.00	104.00	136.00	210.00				
Corporation Cocks, Iron Pipe, without Coupling.....	Per dozen	13.00	16.00	20.00	29.00	46.00	90.00						
Pantry Cocks.....	Per dozen		Brass.		Nickel-Plated.		Silver-Plated.						
Pantry Cocks, Hose End.....	Per dozen		30.00		37.00		45.00		48.00				

COMPRESSION WORK.

SIZE.	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Rough Compression Plain Bibbs.....	Per dozen	8.50	9.50	11.00	17.00	30.00	44.00	68.00	140.00
Finished Compression Plain Bibbs, Flange and Thimble.....	Per dozen	9.00	10.00	12.00	18.00	34.00	52.00	80.00	160.00
Finished Compression Plain Bibbs, Flange, Nut and Bent Coupling.....	Per dozen	16.00	18.00	21.00	28.00	51.00			
Finished Compression Tray Bibbs.....	Per dozen		25.00	32.00	44.00				
Finished Compression Tray Bibbs, Flange and Thimble.....	Per dozen	10.00	11.00	13.00	19.00	36.00			
Finished Compression Tray Bibbs, Flange, Nut and Bent Coupling.....	Per dozen	17.00	19.00	22.00	30.00	53.00			
Finished Compression Bath Bibbs.....	Per dozen		26.00	33.00	46.00				
Finished Compression Bath Bibbs, Flange and Thimble.....	Per dozen	14.00	17.00	20.00	28.00	42.00			
Rough Compression Stops.....	Per dozen		22.00	26.00	36.00	59.00			
Finished Compression Stops.....	Per dozen	6.50	10.50	12.00	18.50	32.00	48.00	84.00	
Finished Compression Hopper Cocks, Finished Flange and Handle.....	Per dozen	10.00	11.00	13.00	19.50	36.00	56.00	96.00	
Rough Compression Hopper Cocks.....	Per dozen	17.00	18.00	22.00	32.00	50.00	100.00		
Rough Compression Hydrant Cocks.....	Per dozen	15.00	16.00	19.00	24.00	34.00	54.00	94.00	
Rough Compression Ball Cocks.....	Per dozen		14.00	17.00	22.00	38.00			
	Per dozen	8.50	9.50	11.00	17.00	30.00			
		Brass.		Nickel-Plated.		Silver-Plated.			
		30.00		37.00		45.00		48.00	

ADD TO STANDARD LIST.

SIZE.	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Add for Iron Pipe.....	Per dozen	1.00	1.00	1.00	1.00	2.00	3.00	4.00	6.00
Add for Hose End.....	Per dozen	2.00	2.00	2.00	2.00	2.50	3.50	4.00	6.00
Add for Nickel Plating.....	Per dozen	2.00	2.00	2.00	2.00	2.50	3.50	4.00	6.00
Add for Silver Plating.....	Per dozen	7.00	8.00	9.00	10.00	15.00	20.00		
Add for Tube Waste, S. O. K.....	Per dozen	1.00	1.00	1.00	1.00	1.50	2.00	3.00	4.00
Add for One End Iron Pipe.....	Per dozen	50	50	50	1.00	1.00	1.50	2.00	3.00
Add for Both Ends Iron Pipe.....	Per dozen	1.00	1.00	1.00	2.00	2.00	3.00	4.00	6.00

MISCELLANEOUS BRASS WORK.

Size.....	1/4	3/8	1															
Hose Pipes, to Tie.....	4 1/2	4 1/2	4 1/2	Entire length														
Per dozen.....	3.00	3.50	4.00															
Size coupling.....	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4				
Hose Pipes, Plain Screw Tip.....	8	12	8	1	12	12	15	20	12	15	30	30	35	40	20	24		
Per dozen.....	8.00	10.00	10.00	12.00	30.00	24.00	30.00	30.00	25.00	30.00	35.00	38.00	50.00	75.00	100.00			
Size coupling.....	3/4	3/4	1	1 1/4	1 1/4	1 1/4	2	2	2 1/4									
Hose Pipes, Plain, without Tip.....	8	8	12	13 1/4	14 1/2	15 1/2	9	2	2 1/4									
Per dozen.....	7.00	9.00	18.00	22.00	34.00	35.00	65.00											
Size coupling.....	3/4	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2 1/4	2 1/4	2	2 1/4	2 1/4		
Hose Pipes, Cock on Large End.....	6	8		12	8		12	12	15	20	12	15	1 1/2	20	15	24		
Per dozen.....	11.00	13.00		18.00	15.00		30.00	40.00	45.00	55.00	60.00	55.00	80.00	80.00	110.00	150.00		
Size coupling.....	3/4	3/4	8	12														
Hose Pipes, Compression.....	8	12	8	12														
Per dozen.....	30.00	24.00	24.00	28.00														
Hose Couplings.....	1 1/2	3/4	1	1 1/4	1 1/4	2	2 1/4	3	3 1/4	4	5	6						
Hose Sprinklers.....	2.40	2.40	4.40	10.00	14.00	24.00	48.00	76.00	120.00	150.00	250.00	450.00						
Size.....	3/4	3/4	1	1 1/4	1 1/4	2	2 1/4	3	3 1/4	4	5	6						
Plain Couplings, Ground Face.....	4.00	4.50	5.00	6.50	8.00	12.00	18.00	24.00	36.00	48.00	70.00							
Plain Couplings, Plain Face.....	3.00	3.50	4.00	5.00	6.50	10.00	15.00	20.00	30.00	40.00	60.00							
Valve Couplings, Ground Face.....	9.00	10.00	12.00	15.00	20.00	30.00	40.00	60.00										
Boiler Couplings, for Copper Boilers, straight plain face.....	7.00	7.50		10.00														
Boiler Couplings, for Copper Boilers, straight ground face.....	8.00	8.50		11.50														
Boiler Couplings, for Copper Boilers, bent plain face.....	8.00	8.50		11.00														
Boiler Couplings, for Copper Boilers, bent ground face.....	9.00	9.50		12.50														
Boiler Iron, for Copper Boiler, straight, plain face.....	7.50	8.00		11.00														
Boiler Iron, for Copper Boiler, straight, ground face.....	8.50	9.00		12.50														
Boiler Iron, for Copper Boilers, bent plain face.....	8.50	9.00		12.50														
Boiler Iron, for Copper Boilers, bent ground face.....	9.50	10.00		13.50														
Boiler Iron, for Copper Boilers.....	Plain face				Ground face.													
Boiler Iron, for Iron Boilers.....	2.50	2.75																
Size.....	1 1/2	3/4	1	1														
Water Back Couplings, straight plain face.....	6.50	7.00	10.00															
Water Back Couplings, straight ground face.....	7.50	8.00	11.50															
Water Back Couplings, bent plain face.....	7.50	8.00	11.00															
Water Back Couplings, bent ground face.....	8.50	9.00	12.50															
Basin Plugs, Common Overflow.....	Brass.				Nickel plated.				Silver plated.									
Basin Plugs, Patent Overflow.....	8.00	8.50		10.00														
Basin Grates.....	9.00	9.50		11.00														
Size.....	12.00	13.00		15.00														
Soap Stone Sink Plugs.....	1	1 1/4	1 1/4	2														
Size.....	15.00	16.00	25.00	40.00														
Lat or Sink Plugs.....	3/4	1	1 1/4	1 1/4	1 1/4	2	2 1/4	2 1/4	3	3 1/4	4							
Vash Tray Plugs.....	2.00	2.50	3.00	4.00	5.50	7.00	10.00	15.00	18.00	36.00								
Size.....	3.50	3.75	6.00	7.00	9.00	10.00	17.00	22.00	44.00									
Trap Screws.....	1 1/2	3/4	1	1 1/4	1 1/4	2	2 1/4	3	3 1/4	4	5	6						
Deck Screws.....	2.00	2.50	3.00	3.50	4.00	8.00	12.00	16.00	30.00	40.00	60.00							
Size.....	10.00	12.00	14.00	18.00	24.00	33.00												



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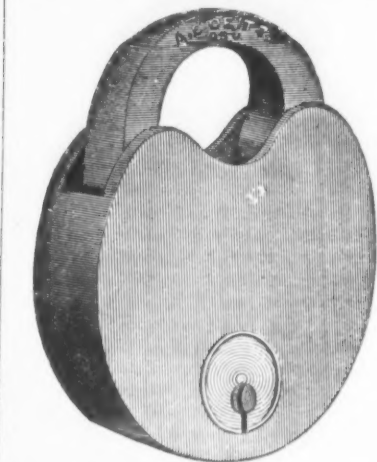
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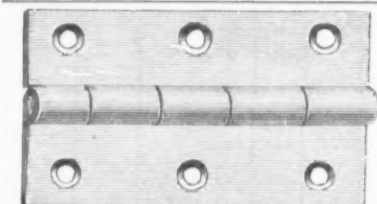
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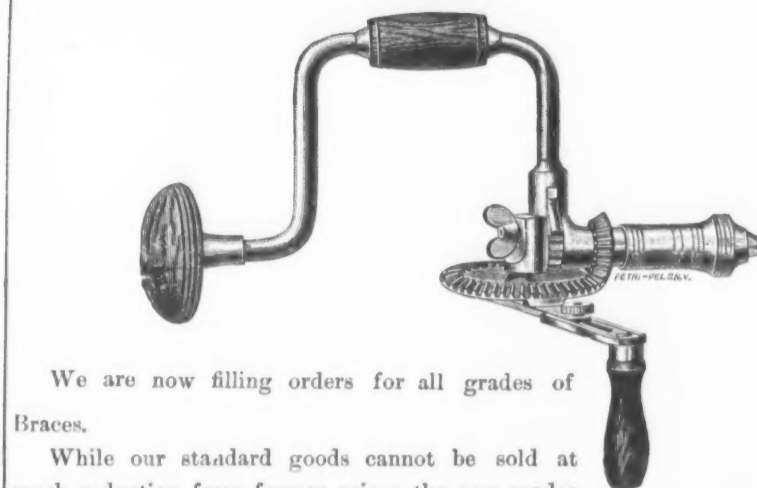
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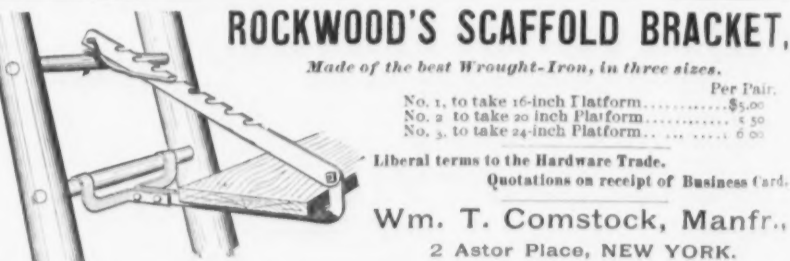
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Mistaken Prophets.

To the Editor of The Iron Age: In the midst of a business depression such as that which now rests upon the trade of the whole world it is natural for men to look eagerly and with intense longing for any indications of the return of better days. With such an earnest desire for the coming of more prosperous times it is not strange that they are often led astray by false signs and the prophecy of the speedy advent of better days. In times like the present, and with strong wishes that are so often the father of the thought, these predictions are readily accepted. This is especially the case with those somewhat remote from great business centers where that undefinable something called "the feeling of trade" does not penetrate. Placing confidence in predictions of a revival, purchases are made, usually on credit, in anticipation of the coming demand. The revival delays in coming, but not the day of settlement for the goods bought, and the merchant who has placed his faith in these false or "previous" prophets finds himself with most of his stock on hand, no customers and his creditors importunate for payment. The weekly bankruptcy reports prove the accuracy of this reasoning. A great increase has been noticed recently in the number of failures among small merchants. A commercial agency reports: "There were 196 failures in the United States during the past week, as compared with 174 in the preceding week, and 185, 160 and 86 respectively in the corresponding weeks of 1884, 1883 and 1882. About 84 per cent. were those of small traders whose capital was less than \$5000." While undoubtedly other causes contribute to bring about this condition of affairs besides the one given, inquiry leads to the belief that in many cases these failures are due to overbuying based upon predictions of a speedy return of prosperity.

Now, while any indications of the return of prosperity should be received with rejoicing and widely published, any premature prophecies of its coming are more injurious to trade. They do more than croaking and prophecies of evil to destroy that confidence which is necessary to bring about a better condition of affairs. It is sure that this depression cannot always last. It requires no prescience to tell this. The recuperative power of the country is too great to permit it to be of long duration. The country will grow up to its idle capacity for production in all, or nearly all, lines of manufactured goods. There may be circumstances outside of the natural growth of population and demand that will hasten the coming of better days for our mills and workshops. A European war might possibly do this. On the other hand, there are circumstances that operate in the other direction. The substitution of steel for iron is one. The uncertainty regarding labor in the Western mills and the possibility of a strike is another. But there is a future day of prosperity to the business of the country, and when it comes it will be because the conditions of demand and supply compel it, not because it is predicted. Nor will predictions hurry its coming, while they may retard it. Human nature is innately suspicious, and such predictions are, among those who think for themselves, usually regarded as made with some covert design, as having some purpose not wholly unselfish. Among this class they not only fail to make a favorable impression, but do a positive injury. "Boosting" never yet helped trade. It has caused it many a time to "overhaul" itself.

In these remarks it has not been my intention to intimate that careful conservative estimates and statements of the condition of trade are injurious or valueless. They are of the utmost importance, and cool headed men are the real "seers" to perceive and forecast the future. What I object to is *ex cathedra* assertions that the day of prosperity is at hand. There have been times in the past when secrecy was the rule in business transactions—when certain persons with special facilities for information had knowledge upon which to base predictions that others did not possess. This is no longer so. The improvement in the character of the market reports of the country in the last 10 years has been remarkable. In addition to this, information as to makes, stocks, demand and the various items that indicate the condition of trade is wonderfully complete in many industries, so that the knowledge upon which to base predictions is accessible to very many men where formerly but few possessed it, and men are inclined to trust their own judgment rather than that of others. This will be done in spite of all predictions, and when from the information that comes to them leading men engaged in leading industries are convinced that the day of prosperity is at hand they will act upon that belief, and until that time the predictions of "previous prophets" will do injury. Respectfully, A CONSERVATIVE.

Good Furnace Work.—The North Chicago Rolling Mill Company have two furnaces at Chicago, two at Milwaukee and three at South Chicago. The latter have done excellent work recently, as the following figures show: No. 5 produced 1241 tons with 2290 pounds of coke per ton; No. 6 produced 1267 tons with 2244 pounds; No. 7 produced 1338 tons with 2188 pounds. This, for the average of the three furnaces, is precisely a pound of coke per pound of pig iron produced. As the iron, which is closely approximating No. 2 Bessemer, is used for direct working, the furnaces cast every three hours, a point which must be considered. The furnaces are 75 feet high, have a 20-foot diameter of bosh, 11-foot breadth and 16-foot top. For their cubical contents, 15,700 cubic feet, the product is as great as any furnace known. The furnaces were remodeled some time ago, and have done excellent work since.

A refractory lining for the pipe-carrying groove of a pipe-welding furnace has been patented by E. Peckham, of Syracuse, N. Y. The pipe is moved longitudinally along the groove, and the latter is subjected to an intense heat, so that the pipe may be brought to a welding heat. The new lining consists of waste or broken unglazed white-ware composed of feldspar, kaolin and clay. This material is crushed into small particles and

spread over the surface of the groove by a long-handled scoop. When the groove is so defaced as to require a thick coat of lining, raw kaolin is mixed with the white-ware.

English and American Blast-Furnace Practice.

In our last issue we gave the details of the number of men employed at several American blast furnaces. Since then we have received a number of letters from others, which we add to those already printed:

A.—A modern coke furnace in the South, 70 x 16, brick stoves, averaging 625 tons of pig iron per week from local hematites, has the following list of employees, including every one connected with the furnace: One superintendent, 2 clerks, 2 foundrymen, 1 machinist, 2 keepers, 6 helpers, 2 stovermen, 2 runnemen, 10 cindermen, 6 ironmen, 2 weighmen, 15 bottom fillers, 4 top fillers, 2 engineers, 2 firemen and water tenders, 1 blacksmith, 1 blacksmith's helper, 1 carpenter, 1 roustabout, 1 messenger and 12 men unloading stock from cars in the stockhouse. This is a total of 79 persons, or, leaving out of account, as not properly chargeable to labor account, the superintendent, 2 clerks and 1 messenger, we have 75 men, or 1.19 tons of pig iron per man employed per day.

B.—Two Southern coke furnaces, 60 feet high, iron stoves, making an average of 550 tons of forge pig per week, have the following force per day of 24 hours, two shifts: In both shifts together they employ 14 fillers, 10 keepers, 3 iron carriers and 2 weighers. The furnace has no cindermen, as that term is commonly understood, but its managers count the moving of the cinder as being equal to the labor of 6 men working 12 hours each. The furnace of course employs a founder, who has an assistant who comes on at night, and 2 engine-men, one on each shift. We understand that the average of four years of the item of furnace labor was 96 cents per ton of iron made, the present cost being lower.

D.—The manager of a modern coke furnace in Western Pennsylvania using brick stoves and smelting local ore writes us that he feels adverse to giving details, because his mixture is unusually low in grade and because he has been only in blast a few weeks, with green hands. In wet weather, with the soft ores of the region, they often handle 7 tons of stock per ton of iron. Still, the following data are of some interest. In the stockhouse the men break, load and run an average of 15 tons each, there being included in the number the weighmaster, who cages one barrow at each lift. Four top fillers—that is, 2 in each shift—fill 500 to 600 tons of stock in 24 hours. Three horses and 10 men, including the contractor, handle about 250 tons of cinder per 24 hours. For putting out the iron before breaking it hot, breaking it into half pigs, weighing, grading and loading it on cars, the manager counts one man for 12 tons. For cast-house work he allows 1 man for 10 tons—that is, making 80 tons a day, he puts four keepers' helpers on each shift, who do all the work inside the casting-house except carrying out the iron. The stove tender, besides doing his stovework, attends to the hoist engine and comes in at the cast to help to run the iron.

E.—Another Southern furnace, 16 x 70, using Connellsville coke, equipped with three Whitwell stoves, and making from 40 per cent. hematite ores 700 tons of pig iron weekly, employs 75 men in the following capacity: One day and 1 night founder, 3 engineers, 2 keepers, 6 keepers' helpers, 10 cindermen, 6 iron carriers, 16 fillers, 2 weighmen, 4 top fillers, 4 men in the blacksmith shop and 1 carpenter, who at the same do the work in the limestone quarry, 2 hot-blast men, 15 laborers and 2 foremen at the boilers. This is equivalent to 1.33 tons of pig iron per man per day.

F.—A coke furnace in West Virginia, with about 7500 cubic feet capacity, making about 250 gross tons per week, has the following crew per 12-hour shift: One keeper, 1 helper, 1 top filler, 5 bottom fillers, 2 cindermen and 1 iron carrier. The cinder at this furnace must be handled with a crane, and, therefore, requires one more man than it would if it could be run into buggies. With the number of men given 112 gross tons of materials, including the pig iron which is weighed and piled or loaded at the cast-house, is handled. The manager writes us that the keeper and helper could as well attend to their work if the furnace made 350 tons of iron per week.

G.—A small furnace in Western Pennsylvania, 42 feet high and 10.5 feet bosh, making 200 tons of iron per week, has 2 blast engineers, 2 keepers, 2 helpers, 4 ore fillers, 2 coke fillers, 1 blacksmith, 1 stock unloader, 2 laborers, 2 cindermen, a driver, an iron carrier and a founder, a total of 21 men per 24 hours, whose total wages are \$27.65. This is equivalent to the labor of 30.7 men at wages of ordinary labor in that section, or 215 days labor per week to make 200 tons of pig iron, or \$0.9678 for labor per ton of pig iron.

H.—A Southern furnace, nearly 70 feet high, using local ores and coke from local coal, and equipped with three Whitwell stoves, has the following number of men employed. It makes 90 tons per day: For the day shift and the night shift each, 1 foundry foreman, 1 keeper, 2 helpers, 2 iron carriers, 1 stockhouse foreman, 7 bottom fillers, 2 top fillers, 2 ore breakers, 1 limestone breaker, 1 limestone wheeler, 1 floor cleaner and ash wheeler, 1 man in charge of boilers, and 1 engineer. During the day shift there are five men to remove the slag, and 4 during the night shift. This latter work is done by contract, and includes the repair of tracks, &c., the company supplying one mule for each shift. Besides the men enumerated there are at work during the day shift 1 man in charge of the pumps and repairs, 1 blacksmith, 1 blacksmith's helper, 1 carpenter, 1 roustabout and 1 bookkeeper and weighmaster. This makes a total of 61 men per day of 24 hours, who receive together wages equivalent to 73.99 times the average wages paid for ordinary labor at the furnace. The product per ordinary labor per shift is therefore 1.216 tons. The labor cost per ton of iron is \$0.8221. In this case the raw material is counted un-

loaded into the stockhouse, the iron being delivered broken in the metal yard.

I.—Two older Southern coke furnaces, which are inconveniently located and therefore use considerable extra labor, may be referred to, although they are not claimed to come up to more modern plants. The two furnaces, making 50 tons of iron per shift, have the following force per shift: Two keepers, 2 helpers, 3 iron carriers, 1 hot-blastman, 1 sandman, 4 cindermen, 6 ore fillers, 5 coke fillers, 4 top fillers, 1 ore breaker, 1 engineer and 1 helper, a total of 31 men.

J.—A 75-foot furnace in the Mahoning Valley, Ohio, using iron stoves, and smelting with Connellsville coke, produces 605 tons per week as the average of a run extending over part of 1883, the whole of 1884 and part of 1885. The average number of men regularly employed is as follows, for 24 hours: One founder, 1 night boss, 2 engineers, 2 keepers, 2 hot-blast men, 4 top fillers, 12 bottom fillers, 6 helpers, 6 cindermen, 2 firemen at boilers, 1 blacksmith, 1 blacksmith's helper, 13 laborers, 4 iron carriers and 2 office employees, a total of 64 men.

K.—This is an anthracite furnace, 15.5 x 55 feet, using iron stoves, and is quoted as showing what work a well-managed furnace of this class is capable of doing. Based on the average of two months, 2566 tons of material were handled, consisting of 583 tons of fuel, three-quarters anthracite and one-quarter coke, 1055 tons of ore, 355 tons of limestone and 573 tons of iron. The furnacemen proper, who work in 12-hour shifts, number 43, divided as follows: Two keepers, 4 helpers, 6 cindermen, 10 fillers, 9 ore and stone breakers and coal cleaners, 4 top fillers, 1 night boss, 1 labor boss and 4 ironmen, who remove all the iron made from the cast-house and load on cars from the bank all that may be shipped, being paid by the ton, while all the other men are paid by the day. The outside force, who work 10-hour shifts, consists of 1 carpenter, 1 blacksmith, 1 helper, 1 car inspector, 1 caster, 2 ore-roaster men, and an average of about 8 laborers, making a total of about 58 men employed. The manager adds that considerable labor could be saved if all the material was received in hopper or dump cars. Most of the stock, however, arrives in flat-bottom railroad cars, and must be shoveled. Considerable labor could also be saved in the stockhouse if all the iron-making material, fuel, &c., could be dumped into hopper bins with chutes high enough to fill the barrows, into which it could then be merely drawn. In this manner a good deal of shoveling could be dispensed with. The severe winters make this plan impracticable, as the ores, fuel and limestone would freeze solid unless prevented from doing so by expensive steam or other heating apparatus. With all access to the lower portion of the bins closed, except through the comparatively small chute, it would be impossible to keep stock loose by any other means. Not a little labor is saved at English furnaces by the almost exclusive use of hopper cars and of bins, by which the labor cost of filling the furnace is materially lessened.

The suggestion has been made by a number of our correspondents that possibly Mr. Porter in reporting Mr. L. Lowthian Bell's statement had misunderstood that gentleman. We inclined to that belief when the matter was first brought to our attention, but any doubts on the subject were set at rest by referring to Mr. Bell's latest work, which we quote as follows:

Page 562.—"On comparing American with English blast furnaces, I have found in some cases that the wages of the best men were a little higher than are current on this side of the Atlantic, but the earnings of the whole staff, and the consequent cost on the ton of iron, are considerably in excess of what is paid with us. This arises partly from the somewhat higher rates paid, and partly from the fact that more hands are engaged per furnace than is the case in the best English and Scotch works. I would also remark that, in spite of high wages in America, neither the rolling stock of the railways which conveys the minerals to the works, nor the mode of dealing with such materials on their arrival, is characterized by the same endeavors to save labor which are so conspicuous in our best-arranged iron works and rolling stock, particularly in the Cleveland district, as shown by the North Eastern Railway."

Page 563.—"Either from the occasional heat in summer, or from an unwillingness to exert themselves as our men do, it is not an uncommon thing in America to have fully twice as many men to do the same amount of work in keeping and attending to the slag as we have in the North of England. This, added to inferior arrangements, generally results in the labor of a ton of metal in America amounting to nearly double, and often even more than double, its cost in England. * * * Speaking generally, I should say that the entire staff of men engaged at blast furnaces in the chief seats of the iron trade in the United States receive on an average from 25 to 30 per cent. higher wages than are paid in the best establishments in Great Britain, while at the same time, as formerly observed, the number of men is considerably greater. As already stated, however, a good deal of this unnecessary expenditure of labor is to some extent due to the absence of those labor-saving appliances for which the best-equipped works with us are distinguished."

The opinions just given embody the general impressions produced on my mind by visits to many smelting works in different parts of the United States. More recently I have been favored by American friends with tabular statements of the actual number of men employed at their respective furnaces, along with the earnings of the entire staff. By comparing these with what may be considered the average practice in the best-arranged of our modern English furnaces, the comparison points to the conclusion that those in the United States one-sixth more men for each furnace are required for producing less than one-half the quantity of iron."

On page 565 we find one of the comparisons upon which this dictum is apparently based. After quoting the weekly earnings of the chief workmen at a Pennsylvania works, Mr. Bell says: "The make of the furnaces to which the above-mentioned rates apply amounted to 260 tons per week, the

fuel used being anthracite. * * * Each furnace has 4 ore fillers and 1 coal filler on each shift, who discharge the materials into the furnace. This, for the work referred to, makes a total of 9 men, against 1½ keepers, 1 slagman, 2½ fillers and 1 top charger—in all 6 men—at an English furnace making 460 instead of 260 tons per week, as in the American." There cannot, therefore, be the slightest misunderstanding as to Mr. Bell's meaning.

The New Demands of the Amalgamated Association.

In addition to the present scale the Amalgamated Association demand the insertion of the following:

Insert in Memorandum of Agreement: "It is understood that in mills running on specialties, separate contracts may be made between the manufacturers, rollers and heaters and the Executive Committee of the district without interfering with this agreement."

BOILING.

Working Swarth on Cinder Bottom. For cast-iron swarth, the price per ton shall be the straight price paid for boiling.

For half wrought and half cast-iron swarth, the price to be 50 cents per ton below the straight price paid for boiling.

For one-third scrap and two-thirds swarth, either wrought or cast iron, the price to be \$1 per ton below the straight price for boiling.

For wrought-iron turnings, \$3.25 per ton, and the price to advance and decline in the same proportion as the boilers' scale.

All balls that pass the squeezers to be paid for.

SMALL MILLS.

For all muck billets or muck bars, and all scrap billets from 1½ inch up, worked on guide, 10 or 12 inch mills, "pile price" shall be paid—50 cents per ton extra, with no percentage off.

For ½-inch rounds and squares, worked from piles, \$1.25 per ton extra shall be paid, with no percentage off.

SHEET AND JOBBING MILLS.

We insist that the conditions of the sheet and jobbing mill scale be complied with, viz.: That the shear-man be paid one-fifth of what the mill makes.

CONTINUOUS TRAINS.

We propose the following scale, based on a 2½-cent car, for continuous mills, such as those in Dilworth, Porter & Co., this city. Also for the bar and 16-inch trains in the same mill.

Rolling on Continuous Trains.

Reheating on Continuous Trains.

Reheating on Continuous Trains.

Reheating on Continuous Trains.

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order. Since the 1st of February there has been a very considerable increase in our sales, the daily shipments averaging from 150 to 200 tons of finished product."

The above statement is difficult to bring into harmony with the recent demand for a reduction of wages, unless there are some points in connection with it which make the result of the two years' business appear more favorable on the surface than it really was. It would be highly interesting in this connection to compare the items in Schedule K with the current prices of materials at the time they were inventoried. If they were estimated at a heavy discount, on the theory that they were not worth more than they could bring at a forced sale, the showing would be more favorable than in reality it ought to be.

Foreign Markets.

FRANCE.

PARIS, April 31, 1885.—Metals.—General business has been a little better. Metals have been moderately active, Copper and Spelter lower. Tin and Lead higher. We quote toward the close: Copper.—Sheet, 113.50 @ 117.50; Ingots and Slabs, 122.50; Best Selected, 123.75; and Pure Corvoro Ore, 124. Tin, Banca, 222.70; Billiton, 218.75; Straits, 215; Australian, 215.75; and English, 215. Lead, 26.75 @ 27.35; and Spelter, 37 @ 37.50. Iron.—Iron dealers in this city held a meeting and resolved to fix the price of Common Merchant No. 1 at 14 and Prime Coke No. 2 at 15 francs. Charcoal sells at 24; Sheets are bringing 20 @ 25, and Wire Nails, No. 18, in bulk, 57 francs, all @ 100 kg. Although in the Northern department business is the reverse of brisk, a similar resolution has been arrived at there, and no more Merchant Iron can be had under 14. In the Haute-Marne Ardennes Merchant No. 2, deliverable at Charleville, commands 14 @ 14.50. Prices are firm in the district, with the tendency upward if anything. Mixed is selling there at 15 @ 16.50; Machine do., at 17.50. The report for the week from Saint-Dizier reads as follows: The general state of the Iron trade has improved during the week; there is a revival in the demand, small orders abound, taking the place of the larger ones in course of delivery. The market evinces great firmness at 14.50 @ 15. Coke, 16 @ 16.50. Mixed, and Wire Nails, No. 18, 57 @ 58 francs. At Valenciennes Ironmaster and his another meeting, but an advance in prices does not yet appear warranted. Coal.—The demand is tolerably good still, so that the price is better sustained than in usually the case so near summer.—*Moniteur des Intérêts Métallurgiques.*

BELGIUM.

BRUSSELS, April 31, 1885.—Iron.—Charleroi reports the receipt of some orders, but at rather lower prices, which does not look encouraging; at Liège the market is quiet and steady on the basis of 1.80 francs for White Pig; Merchant Iron, 11 francs, and Sheets, 14. Here there are no signs of improvement, and matters have a featureless, not to say gloomy, aspect. The only thing of interest is the resolution at which the Minister of Public Works has arrived of using Metallic Sheets for branch railroads, to commence with 100 km. Although Belgium is one of the largest Steel-producing countries in Europe, it will be the last probably to adopt the latest improvements in railway construction. Remunerative work in the iron line is scarce; from the rolling mills down to the machine shops all complain at the extremely low prices obtained. Meanwhile our works adopt new machinery and processes as slowly as possible, and the mines follow in their wake; the consequence is that very important orders are rarely received nowadays. Yet everybody is aware that there would be an advantage in possessing improved machinery. We quote at the close: English Pig, 1.45; Luxembourg, 1.45 @ 1.50; Charleroi, 1.55; Pudding, 4.00 @ 4.80; and Luxembourg, 4.40; Merchant, 11.00 @ 12.50; Beams, 11.75 @ 12.25; Angles, 12.25 @ 13.50; and Sheets, No. 2, 14.00 @ 14.25; No. 3, 16.25; Commercial, 20.25 @ 21.00. An order has been received for 30 locomotives for the Panama Railroad Company. Coal.—Has enjoyed a good demand, even Coal for domestic use, but prices are weak.—*Moniteur Industriel.*

GERMANY.

HAMBURG, April 31, 1885.—Iron.—A tragical sort of business has been done in Rhenish Westphalia during the week, according to the report of our Dortmund correspondent, with the exception of a continued good demand for certain mill products. Iron Ores are depressed by the competition of Spanish. Pig iron is still stagnant; production steadily increases from month to month without meeting with a corresponding demand. Prices are weak and depressed. There is a better export demand for Spiegel without so far improving the price of it; Bessemer and Pudding Pig are neglected and with difficulty sustained in price; Foundry Pig is less wanted and lower; Thomas is in request and looking up, the consumption thereof is on the increase; Luxembourg moves rapidly up and is sustained. Rod iron is in active request, but only for immediate delivery; nobody seems to care for futures. Competition in the rolling-mill branch is great and there is a scheme on foot to agree to a general reduction of output. Those rolling sheets are not fully occupied. The Rolled-Wire trade is still prostrate. There continue to be received good orders for Steel Rails from abroad, but for Domestic lines little transpires; soon, however, these will also come in for a supply. Hardware manufacturers, Locomotive and Car shops are all active, but profits are moderate only. Sufficient occupation is furthermore reported by the machine shops of the district, foundries and iron pipe manufacturers, brood-iron shops and makers of Structural Iron might be busier. Metals.—Lead, under an improved demand, has been firmer; there is no change in either Copper, Spelter or Tin.—*Bornenhalles.*

HOLLAND.

ROTTERDAM, April 18, 1885.—Tin.—Opening weak, the market subsequently improved on a less warlike aspect, but dealings nevertheless remained small. We quote Banca, spot, 18.75 guilders @ 70 kg.; from the coming sale 19; Billiton, spot, 18.25, and August delivery, 19.—*Koch & Vlierboom.*

AUSTRIA.

VIENNA, April 19, 1885.—Iron.—Since Easter business has been about as dull as before the holidays, hopes entertained about the new rolling-mill, destined not to be fulfilled. The six sheet Rail works belonging to the Austrian syndicate produced last year 61,500 tons of Rails, against 87,000 in 1883. Iron has been dull and unchanged. We quote at the close, in florins, 800 lb. weight: No. 48; Gray do., 52 @ 54; Bessemer, 54 @ 56; Merchant, Styrian, 125 @ 130; Bohemian, 105 @ 110; Sheets for Locks, 160 @ 170; do. for Roofing, 160 @ 170; do. for Boilers, 175 @ 185; do. for Tanks, 170 @ 175, and Pillars and Beams, 185 @ 115. Metals have been firm, Tin slightly better, but Spelter weak and neglected.—*Austrian Trade Journal.*

AUSTRALIA.

SYDNEY, N. S. W., April 9, 1885.—Iron.—A satisfactory trade has been transacted in Iron and Hardware, but arrivals have been so heavy that there will be an abundance of supply for some time to come. We quote Galvanized Iron, No. 3, £30, and Fence Wire, £11 17 6. Pig Iron and Tin Plates are unaltered. Per cable via London.

CHILE.

VALPARAISO, March 6, 1885.—Copper.—Holders have evinced a yielding disposition leading to large dealings, 31.75 quintals changing hands at \$18.40 @ \$19.40 per quintal for good ordinary material, 7000 thereof at \$18.80, which, with 2½ freight, is equal to £40 in England. Nitrate.—Favorable cable news has advanced the price from \$2.33 to \$2.85, nominally, at the close, with little offering. Sales during the fortnight sum up 125,200 quintals; the price, with 3½ freight, equals 8.5½ in England. From April to July production is to be restricted to 641,000 quintals per month, and from August to December to 528,000. February shipments have amounted to 14,600 tons to Europe, and to 2400 to the United States. There were loading on March 1 some 21,000 tons for Europe and 600 for the United States. Chartiers since February 21, 25,284 tons for Europe and 210 for the United States. Coal.—Since it has been resolved that Nitrate production is to be curtailed, the Coal demand has been lessened and there is not much prospect of an eventual improvement in prices. We quote: Newcastle and West Hartley, 30; Orell, 27 6; Steam Coal, 28 @ 29.6. Exchange, 21 days, 25½.—*Weber & Co.*

Current Hardware Prices, May 6, 1885.

Tassel and Picture (T. & S. Mfg. Co.).....dis 50
Wrought Staples and Hooks and Staples.....dis 80&108 50

Wrought staples, Stanley's List.....
Screw Hooks and Eyes, See Bright Wire Goods
Gripes and Bush.....dis 50
Whitfibre—Patent.....dis 60
Hooks and Eyes—Malleable iron.....dis 70
Hooks and Eyes—Brass.....dis 90&108 10

Horse Nails.....
Nos. 5 6 7 8 9 10
Ausable.....do 31c 38c 26c 25c 24c 23c.....dis 28&10
National, See Clifton.....do 31c 38c 26c 25c 24c 23c.....dis 28 10
Clifton, Cin.....do 24c 23c 21c 20c 19c.....dis 28 10
Clifton, Fin.....do 24c 23c 21c 20c 19c.....dis 28 10
Essex.....do 31c 38c 26c 25c 24c 23c.....dis 28 10
Dumfries.....do 24c 23c 21c 20c 19c.....dis 28 10
Vulcan.....do 26c 23c 21c 20c 19c 18c.....dis 12c
Northwestern.....do 28c 26c 23c 22c 21c 20c.....dis 10c&15
Pohler, L.....do 28c 26c 23c 22c 21c 20c.....dis 10c
C. C.....do 28c 26c 23c 22c 21c 20c.....dis 10c&10
C. R.—K.....do 28c 26c 23c 22c 21c 20c.....dis 10c&10
Champion.....do 24c 23c 21c 20c 19c 18c.....dis 10c
New Haven.....do 31c 28c 26c 25c 24c 23c.....dis 28 10
Bridgewater.....do 26c 23c 21c 20c 19c 18c.....dis 10c
Chicago.....do 24c 23c 21c 20c 19c 18c.....dis 10c
Champion.....do 28c 26c 23c 22c 21c 20c.....dis 10c&10
Canewell.....do 31c 28c 26c 25c 24c 23c.....dis 28 10

Horse Shoes
Factories.....do 50
R. J. Horse Shoe Co., Perkins' Imp., at fac-
tory.....do 50
Nations, See Clifton.....do 50
Mule Shoes, at factory.....do 50
Hose, Rubber.....do 70 6 70c
S. Y. Belting & Packing Co., Standard.....do 50

Ice Awls, Chisels, &c.
Ames Ice Chisel Pol'd.....do doz \$3.00, dis 20
National, See Clifton.....do doz \$3.00, dis 20
Novelty Ice Breakers.....do doz \$6.25, dis 20
Refrigerator Slide Hand Picks.....do doz \$2.50, dis 20
Dumfries.....do doz \$2.50, dis 20
Wood Head Picks, Sargent's.....do doz \$1.00, dis 50c 10
Iron Head Picks, Sargent's.....do doz \$1.25, dis 10c 10
Pick in handle.....do doz \$2.00, dis 20
Ice Axes, Small Cast or Mail.....do doz \$1.25, dis 20 c 10
Combination Ice Tools.....do doz \$2.00 net
Lumber, See Clifton.....do gross \$55.00, dis 50c 10

Ice Cream Freezer.....do 60c 2
Buffalo Champion, S. S. & Co.....do 60c 2

Ice Tongs.....do 40
S. S. & Co.....do doz \$4.00, dis 25c 10
Family.....do doz \$2.75, dis 20 c

Jack Screws.....do 40 10 to 50 g
Sellers list.....do 40 10 to 50 g

Kettles
Brass, 7 to 17 in. Inches.....do 20c Net
Brass larger than 17 inches.....do 22c Net
Cast Iron and Tea Kettles.....See Hollow-Ware

Knives
Ames' Butcher Knives.....dis 25 c
Nichols' Butcher Knives.....dis 40 10 c
Ames' Bread Knives.....dis 15 c 15k 5 c
Moran's Shoe and Bread Knives.....dis 20 c
Cutlery and Straw.....See Hay Knives
Table and Pocket Knives.....See Cutlery

Knobs
Carriage, Japanese.....do gross 80c, dis 60c 10
Butter, German.....do 10c 10
Hamacoe Door Knobs, new list.....dis 35c 5 c
Door Mineral.....Same discounts as Door
Door Por., Plated.....Locks, but lower net prices
Door Por.....do 75c gross then, dis 10
Furniture, Wood Screws.....dis 25c 10
Picture, Judd's.....dis 60c 10 10 c
Doz. Metal.....do doz \$2.00, dis 10 c
Hamacite, Picture.....dis 10 c
Shutter, Porcelain.....dis 65c 10

Ladders
Melting, Sargent's.....dis 40 10 c
Melting, Reading.....dis 40 10 c
Melting, Monroe's Patent.....do doz \$4.00, dis 40 c
Sargent's & W.....dis 30c 10

Lanterns
Tubular, Standard No. 1, do doz.....\$6.75 ds \$7.00
Tubular, Standard No. 0, do doz.....8.50 ds 9.00
Eucalyptus, do doz.....8.50 ds 9.00
Tubular, Lift Wire, No. 1, do doz.....10.50
Guards for Tubulars, all do doz.....25
Electric, Small, do doz.....\$7.50 ds \$8.00
Porter's Tin R. R.....do 10c 15 c
do 80, dis 20c 25 c

Lawn Rollers
Excelsior Roller.....dis 40 10 c
Rolling, "Star White".....dis 40 10 c
Clippers.....dis 10c 10 10 c
Philadelphia.....dis 40 10 10 c
Boston Juniors.....dis 50 ds 50 10 c

Leather Sewers.....do doz \$3.00, dis 35c 5 c
Food.....do doz \$3.00, dis 35 c
Eucalyptus.....do doz \$3.00, dis 35 c
Duplay's Improved.....do doz \$3.75, dis 20 c
Samuels.....No. 1, 85; 2, 90; 12, 118 do doz, dis 25c 10 c
"Golden Star".....do doz \$3.00, dis 35 c
"The Boss".....do doz \$4.00, dis 10c 10 c
"Little Giant".....do doz \$15.00, dis 10c 10 c
Acme.....do gross \$55.00, dis 50 c
Cotton Chalk.....dis 50 c
Silver Lake, Braided, Nos. 0, 80.00; No. 1, 80.50; No. 2,
81.00.....dis 25 c
Masons' Linen, No. 3½, \$1.50; No. 4, \$2; No. 4½,
\$2.50.....do gross \$55.00, dis 50 c
Wire Colored Cotton.....dis 45 c
Flax Clothes, No. 18, \$3.50; No. 19, \$3.00; No. 20,
\$2.50.....do gross \$55.00, dis 50 c

Lock, Padlocks, Cabinet Locks, &c.
Door locks, new list, Dec. 10, '84, some numbers
changed February 5, 1885.....dis 60c 5c 10 c
Cladding Hardware Co. (list Feb. 2, 1885).....dis 70 c
Padlocks, Yale, do doz.....do 40 c
F. May's "Extension Cylinder".....do 10.50 do doz net
Barnes Mfg. Co.....do 30 c
Yale's "Safe" Combination.....do 40 c
Dietz Flat Key.....do 30 c
Stoddard.....do 30 c
Castro & E.....do 40 c 10
Plain Key Latches.....dis 40 10 c
Cabinet Key Latches.....dis 35c 10 c
Cabinet, Chicago.....do 40 c
Cabinet, Gaylord.....of some numbers March
Cabinet, Parker.....10, 1884, and Jan. 1, 1885,
dis 40 c
Cabinet, A. & Deltz.....dis 30c 40 c
Cabinet, Stoddard Lock Co.....dis 30 c
Cabinet, Yale.....dis 40 c
Yale new list.....do 40 c
"Shepardson" or "U. S.".....dis 35 c
"Key Brand".....do 40 c 10
Case and Corbin Trunk.....do 40 c 10
"Champion" Night Latches.....dis 40 c
"Champion" Cabinet and Combination.....dis 35c 5 c

Russell & Erwin.....do 40 c
Willory Wheeler & Co., New York.....New list Dec. 23, 1884,
dis 60c 5c 10 c
Wm. Wilcox & Co.....dis 60c 5c 10 c
Jerwick Lock Co.....do 40 c
Yale Lock Mfg. Co., do 40 c
Eagle.....dis 25c 2 c
Romero's Nos. 0 to 81.....do 40 c
Yale's "Safe" Combination.....do 40 c
A. E. Dietz.....dis 35 c
House Shop, do 40 c
Fram's Pat. Scandinavian, new list (low).....dis 60 c
Barnes Mfg. Co.....dis 40 c 10
Brown's Patent.....dis 25 c
Scandinavian.....dis 87½ c 87½ c 5 c
Scandinavian Padlocks.....dis 35c 5 c

Lumber Tools
Steel Peavies, "Blue Line" Finish.....do doz \$2.00
"Black Line" Finish.....do doz \$1.80
Steel Steel Peavies.....do doz \$1.80
Mail Iron Socket Peavies.....do doz \$1.00
Pike Hook, "Blue Line" Finish.....do doz \$1.00
Ant Hoods, Common Finish.....do doz \$1.00
Ant Hoods, Mail, Socket Finish, "Blue Line"
Finish.....do doz \$1.00
Ant Hoods, Mail, Socket "Clasp, Common"
Finish.....do doz \$1.00
Ant Hoods, "Clip Clasp," "Blue Line" Fin.....do doz \$1.00
Ant Hoods, "Clip Clasp, Common Finish.....do doz \$1.00
Hand Spikes.....do doz 6 ft. \$15.00; 8 ft. \$20
Pike Poles, Pike & Hook.....12 ft. 14 ft. 16 ft. 18 ft. 20 ft.
do 10.00 13.50 14.50 16.50 21.50
Pike Poles, Pike only, do
do 10.00 11.00 12.00 13.00 16.00
do 4.00 7.00 9.00 12.00 16.00
Splitting Pole, do doz.....do 14.00 15.00 17.00
Swamp Hook, do doz.....do 82.50
and Blinks.....do doz \$2.50
Splitting Tongues.....do doz \$5.00
Yielding.....do doz \$5.00
Splendid Bolt Calls, 1 to 5 M, dis 25; 5 to 10 M, dis 40
Square Steel Bolt Calls.....dis 40 c
Yield Bar.....do doz \$5.00
Splitting Rafting Dogs.....do 100, med., \$10.00; large, \$12.00
Timber Grapples.....do doz \$30.00
Four ounce bottles.....do doz \$1.75; 7 oz. \$1.00 net

Mallets
Hickory.....dis 10c 10 10 c
Lignumvitae.....dis 10c 10 10 c
Winfield Block Co., Lignumvitae and Hickory.....dis 30 c

Matticks.....dis 60 10 c

Meat Cutters
Ixon's (F. S. & W.), Nos. 1 2 3.....do \$22.00 30.00 40.00—dis 40 c
Hickory Challenge.....Nos. 1 2 3.....do \$22.00 30.00 40.00—dis 40 c
Foodruff's (P. S. & W.).....do \$15.00 18.00—dis 45 c
Ixon's.....Nos. 11 12 13.....do 35.00 40.00—dis 20 c
Raw Cut.....Nos. 10 12 30 50.....do 60c 10 10 c 20 c 70 c
Jaw.....do 50.00 75.00 80.00 225.00 400.00—dis 20 c
American.....do 55 c

Trunks, Warehouse, &c.
Pontiff Block Co.'s Best, 1582. 10 10 10
Twines. 19 14 10
No. 1, Flax Twine, 4 and 6 lb. Balls. 14 10 10
No. 18, " " 4 and 6 lb. " " 14 10 10
No. 30, " " 4 and 6 lb. " " 14 10 10
No. 30, Mattress, 4 and 6 lb. " " 14 10 10
Chalk Line, Cotton, 7 1/2 Balls. 2 50
Mason Line, Linen, 6 lb. Balls. 2 50
2 Ply Hemp, 4 and 6 lb. Balls (Spring Twine). 14 10 10
3 Ply " " 4 and 6 lb. Balls. 14 10 10
Cotton Wrapping, 5 Balls to 2 1/2 doz. 11 1/2 10 20
Wood, 6 1/2 10 10
Cotton Mops - 6, 9, 12 and 15 lb. to doz. 1 10
V
Void Box. dis 508 10 10
Parallel, Fisher & Norris Double Screw, dis 158 10 10
Parallel, Stephens, dis 10 10 10
Parallel, Parker's, dis 20 10 25
Parallel, Wilson's, dis 30 10 10
Parallel, Howard's, dis 40 10 10
Parallel, Bennett's, dis 40 10 10
Parallel, Morrill's, dis 158 20 10
Parallel, Sargent, dis 108 10 10
Parallel, Backus and Union, dis 40 10 10
Parallel, Double Screw Laid, dis 158 10 10
Parallel, Prentiss, dis 298 20 10
W
Washers, Adjustable. dis 10 10 10
Saw Filers, Donney's, Nos. 2 & 3, dis \$15.00, dis 10 10 10
Saw Filers, Stearn's, dis 40 10 10
Saw Filers, Hopkins, dis \$17.50, dis 10 10 10
Saw Filers, Reading, dis 108 10 10
Saw Filers, Westworth, dis 208 10 10
Bonney's, dis 108 10 10
Richardson's Vise and Auger, dis 25
Washer Cutters.
Smith's Patent, dis \$12.00, dis 208 10 10 10
Johnson's, dis 10 10 10
Penny's, dis \$17.50, dis 10 10 10
Appleton's, dis \$10.00, dis 108 10 10
Bonney's, dis 108 10 10
Washers. - See Nuts and Washers
W
Well Wheels - 8 in., \$1.50; 10 in., \$2.15; 12 in., \$2.00
Wire.
Brass and Copper, new list, Jan. 18, '84, dis 308 308 5
Market, Coppered, dis 458 458 5
Market, Galvanized, dis 608 608 5
Market, Tinned, dis 608 608 5
Some, Bright and Annealed Nos. 10 to 20, dis 708 708 5
Stone, Bright and Annealed Nos. 27 to 30 dis 758 708 5
Stone, Galvanized, Nos. 10 to 30, dis 758 708 5
Market, Tinned, dis 608 608 5
Stone, Tinned, Tinned Bar, dis 608 608 5
Tinned Broom Wire, dis 658 658 5
And Steel Wire, dis 658 658 5
Annealed, Fence, Nos. 8 and 9, dis 708 708 5
Annealed Gauge, Nos. 10 to 11, dis 708 708 5
Fence Staples, dis 708 708 5
Fence Staples, Galvanized, dis 708 708 5
Staple Steel Wire, dis 80 10 10
Barb Fence, See Trade Report
Barb Wire Safety Guards, dis 108 10 10
Wire on Spools, dis 45 10 10
Steel Music Wire, Nos. 7 to 30, dis 608 10 10
Wire Clothes Lines, See Lines.
Wire Cloth, green, drab and black, 1/2 100 sq. ft.
W
Wrenches. - American Adjustable, dis 5 10 10
Baxter's Adjustable "S" dis 10 10 10
Baxter's Diagonal, dis 10 10 10
Best Genuine, 10 to 14 in., dis 40 10 10
Crest "Mechanics", dis 508 108 10
Cresc. Pattern, Malleable, dis 80 10 10
Cresc. Pattern, Wrought, dis 758 10 10
Gilard Standard, dis 70 10 10
Gilard Agricultural, dis 758 10 10
Bemis & Call's "Y" Pipe, dis 308 10 10
Bemis & Call's Merrick's Pattern, dis 308 10 10
Bemis & Call's Bridge's Pattern, dis 30 10 10
Bemis & Call's Cylinder or Gas Pipe, dis 108 10 10
Bemis & Call's "Y" Pipe, dis 308 10 10
Alken's Pocket (right), \$1.00, dis 508 10 10
The Favorite Pocket (right), dis \$1.00, dis 40 10 10
Webster's Patent Combination, dis 25 10 10
Boardman's, dis 258 10 10
"Always Ready", dis 258 10 10
Alligator, dis 108 10 10
Donohue's Engineer, dis 25 10 10
W
Wringers. Per doz.
Novelty, for Common Tubs, No. 2, 10 inch \$30.00
Novelty, for Common Tubs, No. 3, 14 inch 34.50
Excelsior, for Stationary Tubs, No. E, 10 inch 30.00
Excelsior, for Stationary Tubs, No. F, 14 inch 45.50
Excelsior, with Folding Bench, No. A, 10 inch 48.00
Excelsior, with Folding Bench, No. B, 14 inch 52.50
Universal, No. 24, 30.00
Universal, No. 7, 32.00
Universal, No. 14, 34.50
Universal, No. 19, 30.00
Universal, for Set Tubs, A, 24, 30.00
Universal, for Set Tubs, E, 14, 48.00
Universal, for Set Tubs, C, 14, 48.00
Adams & Co., No. 8, 20.00
Peerless No. 20, 30.00
Peerless No. 30, 34.50
"Metropolitan", No. 2, 32.00
"Metropolitan", No. 24, 30.00
Advance, 30.00
Wrought Staples, Hooks, &c. - See Hooks.
S. H. & E. Y. MOORE.
163 & 165 Lake St., Chicago.
BEAUY HARDWARE
AND
Railroad Supplies.
MANUFACTURERS OF
'CLIMAX' BARN DOOR HANGERS,
'ZENITH' BARN DOOR HANGERS,
For Wood Trucks,
MOORE'S FREIGHT CAR DOOR HANGERS
BAGGAGE CAR DOOR HANGERS.
RAILROAD HANGERS,
PARLOR DOOR HANGERS.
Send for New Price Lists.
EASTERN AGENTS:
H. B. NEWHALL CO.
105 Chambers St., New York. 47 Pearl St., Boston.
ing Materials.
Incorporated 1881. THE
Largest Manufacturers
IN THE WORLD OF
Nickel Anodes,
Nickel Salts,
Patent Muslin Buffs,
Polishing Lathes,
Polishing Felt,
Polishing Rouges,
Pol'ng Compositions,
Walrus Leather,
Wood Emery Wheels
Platers' Brushes,
&c., &c., &c.
OFFICES,
to 40 11th Ave. NEW YORK U.S.A.

WHOLESALE METAL PRICES, May 6, 1885.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢; provided that no Bar Iron shall pay a less rate of duty than 35¢. Sheet, 11-10¢ to 15-10¢. Band, Hoop and Scroll, 1¢ to 14-10¢. Railroad Bars weighing more than 25 lb. yard, 7-10¢ to 14¢.

Standard American Pig Iron.

Foundry No. 1 X..... 19.00 @ 18.50
Foundry No. 2 X..... 17.00 @ 17.50
Gray Forge..... 16.00 @ 16.50

No. 1 Scotch Pig Iron.

Cambrose..... 19.00 @ 19.50
Coltress..... 21.00 @ 21.50
Shotts..... 21.50 @ 22.00
Glenarnock..... 21.00 @ 21.50
Langloath..... 21.50 @ 22.00
Summerlee..... 20.50 @ 21.00
Dalmellington..... 19.00 @ 19.50
Eglington..... 18.00 @ 18.50
Clyde..... 19.00 @ 19.50

Rails.

Steel, at Eastern mills..... 20.50 @ 21.00
Old Rails, Ts..... 16.50 @ 17.00

Wrought, 7 ton, from yard..... 18.50 @ 19.00

Bar Iron from Store.

Common Iron:
3/4 to 1 in. round and square..... 1.5 @ 1.75¢
1 to 1 1/2 in. round and square..... 1.8 @ 2.1¢

Refined Iron:
3/4 to 1 in. round and square..... 1.8 @ 2.1¢
1 to 1 1/2 in. round and square..... 1.9 @ 2.4¢

Rods—4, and 11-16 round and sq..... 1.8 @ 2.3¢
Bands—1 to 6x3-16 to No. 12..... 2.1 @ 2.5¢

Burden's Best "Iron, base price..... 2.2¢
Burden's "H. B. & S." Iron, base price..... 2.5¢
Norway Nail Rods..... 5 @ 6¢

Sheet Iron from Store.

Common American R. G.
Nos. 10 to 16..... 2.20 @ 3.4¢
17 to 20..... 2.3 @ 3.5¢
21 to 24..... 2.4 @ 3.6¢
25 and 26..... 2.5 @ 3.7¢

Galvanized, 10 to 20..... 5 @ 4¢
Galvanized, 21 to 24..... 5 @ 4¢
Galvanized, 25 to 26..... 6 @ 4¢
Galvanized, 27..... 7 @ 4¢
Galvanized, 28..... 7 @ 4¢
American Russia..... 10 @ 4¢
Russia..... 10 @ 4¢
American Cold Rolled B. B..... 10 @ 4¢

Iron Wire. See Wire.

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb. or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb., 25¢ ad. val.; valued above 7¢ and not above 10¢ per lb., 25¢ ad. val.; valued above 10¢ per lb., 35¢ ad. val. Steel Bars, Rods, &c., cold hammered or polished, in any form, in addition to ordinary hot rolling, 14¢ per lb. in addition to above; Steel Circular Saw Plates, 1¢ per lb. in addition to the above.

American Cast Steel.

For American Steel, see Pittsburgh quotations.

English Steel.

Best Cast..... 10 @ 15¢
Extra Cast..... 10 @ 15¢
Circular Saw Plates..... 10 @ 15¢
Round Machinery, Cast..... 10 @ 15¢
Swaged, Cast..... 10 @ 15¢
Best Double Shear..... 10 @ 15¢
Blister, 1st quality..... 10 @ 15¢
German Steel, Best..... 10 @ 15¢
3d quality..... 10 @ 15¢
Sheet Cast Steel, 1st quality..... 10 @ 15¢
3d quality..... 10 @ 15¢
3d quality..... 10 @ 15¢

TIN.—Duty: Plates, Sheets, Tagger and Terne, 1¢ per lb. Bars, Block and Pils free.

Banca..... 20 @ 20¢
Straits..... 20 @ 20¢
English..... 20 @ 20¢
Bar..... 20 @ 20¢

Charcoal Tin Plates.

1 C 10x14 25 sheets..... 5.00 @ 7.00
1 C 12x18 25 sheets..... 5.00 @ 7.00
1 C 20x28 112..... 10.00 @ 14.25
1 X 10x14 25 sheets..... 6.25 @ 8.75
1 X 12x18 25 sheets..... 6.25 @ 8.75
1 X 14x20 112..... 5.00 @ 7.00
1 C 12x18 112..... 5.00 @ 7.00
1 X 12x18 112..... 5.00 @ 7.00
For each additional X add..... 1.35 @ 2.00

Coke Tin Plates.

Best. Ordinary.
1 C 10x14..... 4.75 @ 4.50 @ 4.00
1 C 12x18..... 4.875 @ 4.625 @ 4.75
1 C 10x20, gutters, 25 sheets, 5.00 @ 7.25
1 C 20x28, 112 sheets..... 10.00

Tin Boiler Plates.

IXX 14x36, 2 sheets for No. 7, 112 sheets..... @ \$12.00
IXX 14x36, 2..... No. 8..... @ 12.00
IXX 14x36, 2..... No. 9..... @ 15.00

COPPER.—Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢; Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad. val.

Ingot, Lake..... 113¢ @ 113¢
Ingot, Baltimore..... 113¢ @ 113¢
Ingot Anchor..... 113¢ @ 113¢
Braziers' Copper, ordinary sizes, 16 oz. per sq. ft. and over..... @ 17¢
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq. ft..... @ 19¢
Braziers' Copper, 10 oz. and 12 oz. per sq. ft. and over..... @ 21¢
Lighter than 10 oz. per sq. ft..... @ 23¢
Circles less than 84 in. in diam..... @ 23¢
Segment and Pattern Sheets..... @ 23¢
Locomotive Fire Box Sheets..... @ 23¢
Sheeting Copper, over 12 oz. per sq. ft..... @ 16¢
Bolt Copper..... @ 17¢
Copper Bottoms..... @ 18¢
Nickel Plated Sheathing..... @ 27¢
Plating extra..... @ 25¢ @ 27¢
Flat Copper Boiler Bottoms or Pit Bottoms, cut to special sizes..... @ 21¢

Tinning.

14x48, by the case..... 14 sheet, 5¢
4x18, less than 10 oz. per sq. ft. and over..... 14 sheet, 5¢
For tinning both sides, double the above amount.

O'Neill's Patent Planished Copper. Net.

14 and 16 oz. and heavier..... 3¢ By the case, 14 sheet, 5¢
12 oz. and lighter..... 3¢ By the case, 14 sheet, 5¢

Copper Wire. (See Wire.)

Sheathing Metal.
Yellow Sheathing Metal, 7 lb..... 20 @ 21¢

BRASS AND GERMAN SILVER.

Brown & Sharpe's Gauge the Standard for Metal;
Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1884.
D: Pipe and Sheet, 3¢ per lb.

LEAD.—Duty: Pig, 2¢ per 100 lb.; Old Lead, 3¢ per 100 lb.; Pipe and Sheet, 3¢ per lb.

American..... 3.80 @ 4.1¢
Bar..... 3.80 @ 4.1¢
Pipe..... 3.80 @ 4.1¢

Block Tin Pipe..... 40¢
Tin Lined Pipe..... 15¢, dis 20¢
Sheet..... 6 1/2¢, dis 30¢
Shot..... Drop, 6¢; Buck, 7¢
Chilled Shot..... 7¢

ANTIMONY.
Hallett's..... 10 1/2 @ 10 1/2¢
Cookson..... 10 1/2 @ 10 1/2¢

SPECIALTY.—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.

American, cash..... 4¢ @ 5¢
Bergenport..... 4¢ @ 5¢
ZINC.—Duty: Pig or Block, \$1.50 per 100 lbs.

Sheet..... 5 1/2¢ @ 5 1/2¢
600 lb. casks..... 5 1/2¢ @ 5 1/2¢
Zinc Tubing..... dis. 10 @ 30¢

Zinc Tubing.—Dis. 25¢.

Plain..... 37¢
Fancy..... 37¢
Scotch and Extra Patterns..... 38¢

BABBIT METAL.
N. P. U..... 10¢ @ 10 1/2¢
X..... 10¢ @ 10 1/2¢
J. H..... 10¢ @ 10 1/2¢

WIRE.
Market Wire.—Put up in 63 lb. bundles.
Nos. 00 to 9, 10, 11, 12, 13, 14, 15, 16, 17, 18.

10 11 11 1/2 12 12 1/2 13 14 15 16

Bright Market Wire..... dis 70¢ 5¢
Charcoal..... dis 70¢ 5¢
Bale Wire, Nos. 7 to 12..... dis 70¢ 5¢

Annealed Market Wire..... dis 70¢ 5¢
Fence Wire, Nos. 8 and 9..... dis 70¢ 5¢
Grape Market Wire..... dis 65¢ 5¢

Coppered Market Wire..... dis 65¢ 5¢
Bale Wire, Nos. 7 to 12..... dis 65¢ 5¢
Galvanized Market Wire..... dis 60¢ 5¢

Fence Wire..... dis 60¢ 5¢
Stone or Weaving Wire.
Nos. 16 17 18 19 20 21 22 23 24 25 26

Cents..... 14 15 16 17 18 19 20 21 22 23 24 25 26

Nos. 27 28 29 30 31 32 33 34 35 36

Cents..... 27 28 29 30 31 32 33 34 35 36

Nos. 16 to 18..... dis. 70¢ 5¢
19 to 26..... 70¢ 5¢
27 to 36..... 75¢ 5¢

Galvanized Stone Wire..... 55¢ 5¢
Steel Wire.
Cast Steel, Steel Wire List..... dis. 55¢ 5¢

Brass and Copper Wire.
Old English Gauge the Standard.—Dis 20 @ 30

Common High Low
Nos. 12 and 13..... 20¢ 25¢ 30¢
19 and 20..... 21¢ 26¢ 31¢

21..... 22¢ 27¢ 32¢
22..... 23¢ 28¢ 33¢
23..... 24¢ 29¢ 34¢

24..... 25¢ 30¢ 35¢
25..... 26¢ 31¢ 36¢
26..... 27¢ 32¢ 37¢

27..... 28¢ 33¢ 38¢
28..... 29¢ 34¢ 39¢
29..... 30¢ 35¢ 40¢

30..... 31¢ 36¢ 41¢
31..... 32¢ 37¢ 42¢
32..... 33¢ 38¢ 43¢

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35..... 36¢ 41¢ 46¢

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37..... 38¢ 43¢ 48¢
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43..... 44¢ 49¢ 54¢
44..... 45¢ 50¢ 55¢

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74..... 75¢ 80¢ 85¢

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77..... 78¢ 83¢ 88¢

78..... 79¢ 84¢ 89¢
79..... 80¢ 85¢ 90¢
80..... 81¢ 86¢ 91¢

81..... 82¢ 87¢ 92¢
82..... 83¢ 88¢ 93¢
83..... 84¢ 89¢ 94¢

84..... 85¢ 90¢ 95¢
85..... 86¢ 91¢ 96¢
86..... 87¢ 92¢ 97¢

87..... 88¢ 93¢ 98¢
88..... 89¢ 94¢ 99¢
89..... 90¢ 95¢ 100¢

90..... 91¢ 96¢ 101¢
91..... 92¢ 97¢ 102¢
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94..... 95¢ 100¢ 105¢
95..... 96¢ 101¢ 106¢

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97..... 98¢ 103¢ 108¢
98..... 99¢ 104¢ 109¢

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100..... 101¢ 106¢ 111¢
101..... 102¢ 107¢ 112¢

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103..... 104¢ 109¢ 114¢
104..... 105¢ 110¢ 115¢

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106..... 107¢ 112¢ 117¢
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213..... 214¢ 219¢ 224¢
214..... 215¢ 220¢ 225¢
215..... 216¢ 221¢ 226¢

216..... 217¢ 222¢ 227¢
217..... 218¢ 223¢ 228¢
218..... 219¢ 224¢ 229¢

219..... 220¢ 225¢ 230¢
220..... 221¢ 226¢

INDUSTRIAL ITEMS.

MAINE.

The Goss Marine Iron Works, Bath, have just completed machinery for the steamer Haytien Republic, built for the Diamond Mail Steamship Company, of Boston. The engines are of the compound receiver type, with vertical overhead cylinders. Dimensions as follows: Cylinders, one 22-inch and one 44 inch; length of stroke, 3 feet; estimated horse-power, 650; estimated speed, 10 knots. The boilers are steel, Scotch type, and 10 feet 10 inches diameter x 11 feet 4 1/2 inches long. This concern is also building an engine designed specially for speed, to be placed in a new steam launch 45 feet long.

NEW YORK.

The Elmira Repair Shops of the Pullman Car Company have been reopened in consequence of the burning of their extensive shops at Philadelphia. Eighty skilled workmen have been taken from Philadelphia to Elmira. The shops have been idle for several months.

NEW JERSEY.

Secaucus Furnace, blew out the middle of last month, but will go in again very soon.

Franklin Furnace, in Sussex County, is about to blow out.

PENNSYLVANIA.

The Bryden Horseshoe Works, of Catawqua, are very busy at present, the full force working until 8 o'clock every evening. The works are about to be enlarged by occupying the whole building and the addition of a new drop hammer, in which case the output will be very largely increased. The shoes being turned out are giving much satisfaction, in consequence of which increased orders are being received.

The Norway Furnace, at Bechtelsville, operated by Messrs. Gable, Jones & Gable, of Pottstown, was blown out on April 28, owing to the fact that the inner wall of the furnace was burnt away. It had been running successfully for over two years. The firm will at once commence its relining and other repairs, and will be ready to start in about three months' time.

The Manhattan Hardware Company, of Reading, have determined to sell their present buildings, owing to lack of room, but have not yet decided as to their future movements. A liberal offer has been received from Scranton, whose citizens are desirous of securing the works. It is not certain that the firm will not remain in Reading.

Ormsd, Fisher & Co., of Emaus, have secured a large contract for pipe, and their works will be started at once. They have been idle for some time.

The Sharon Iron Company, of Sharon, manufactured some steel nails last week from purchased slabs, the article turned out being satisfactory in every respect. The company have blown out their blast furnace.

The Pottstown Iron Company have broken ground for the foundation of their new steel mill.

The Mount Penn Stove Works, of Reading, are about to erect two large buildings, in extension of their already large works. One, 50 by 90 feet, and four stories high, will be used as a warehouse and mounting-room, and the other, 50 by 30, two stories in height, as an extension to the cleaning and polishing departments.

Keel Ridge Furnace, at Sharon, owned by P. L. Kimberly & Co., will shortly be blown out, the lining having been burned through.

The blast furnaces of the Mount Hickory Iron Company, at Sharpsville, the sale of which was announced in our last issue to take place on May 30, will be sold in liquidation of the affairs of the company. The rolling mill and other property of the same company at Erie will be sold on May 28.

It is possible that a large chemical works may be established at Sharon by certain European chemists desirous of manufacturing their specialties in the United States. The citizens of Sharon are in negotiation with them, and Wampum is also making overtures with a view of securing the works.

The Crane Iron Company are about to increase largely the pumping plant at their blast furnaces.

The "Castle" pig iron is a new brand made on the Lehigh, and at this time is attracting a good deal of attention. It is specially adapted for open-hearth steel and the finer grades of Bessemer, and is rapidly displacing leading brands of English Bessemer, which for certain purposes have hitherto been considered almost indispensable. Seventeen analyses were made by Booth, Garrett and Blair, showing an average of phosphorus of .0325, and in 11 by Mr. Otto Wuth, with the result of .03273. W. R. Hart & Co., of Philadelphia, are the agents for the "Castle."

Bradlee & Co., proprietors of the Empire Chain Works, have just filled a large order of 1 1/2 and 3/4 inch dredging chains for the Phosphate Mining Company, of Charleston, S. C., and have recently shipped a carload of chain to the harbor commissioners at Montreal, securing the contract in competition with the English manufacturers. They are also about completing a large contract for the United States Lighthouse Department for 800 feet of heavy chain. This firm are the manufacturers of a brand of mining and dredging chain made of combined iron and steel, from which they are in receipt of the most flattering reports from all quarters, including the United States Engineer Corps and the principal dredging companies throughout the United States.

The firm of Gordon & Strobel, 226 Walnut street, Philadelphia, has been enlarged by the admission of Mr. G. Lareau, who has formed an association with Mr. Fred W. Gordon and Victor O. Strobel, under the style of Gordon, Strobel & Lareau. The firm will undertake general metallurgical engineering in the construction of blast furnaces, Bessemer and open-hearth plants, gas producers, heating furnaces, rolling-mill plants, nail works, &c. Messrs. Gordon & Strobel are widely

known as accomplished and experienced metallurgical engineers. Mr. Lareau, originally associated with the late A. L. Holley, is a most competent engineer and will have especial charge of the designing and construction of the plants. He is a valuable acquisition to the firm of which he becomes a member.

The Merion Iron Company, of West Conshohocken, are preparing to blow in one of their furnaces.

The Blandon Rolling Mill has again suspended on account of lack of orders.

Chulasky Furnace, in North Cumberland County, and one of the Glamorgan Furnaces, at Lewistown, will soon blow in.

PITTSBURGH AND VICINITY.

The rolling mill of Everson, Hammond & Orr is at present running non-union, a difficulty regarding wages having occurred with the Amalgamated Association. It is stated that a number of union men have returned to work, though without the sanction of the association.

The Westinghouse Machine Company, corner of Penn avenue and Twenty-fourth street, notified 75 of their employees on April 28 that their services would no longer be needed after May 28.

A bill in equity was filed in Common Pleas No. 1 on April 30 by the executors of the last wills of George Porter, H. M. Rolfe and J. H. Swett against Lawrence, Charles and Joseph R. Dilworth, executors of the will of the late Joseph Dilworth, to compel the settlement of the affairs of the late firm of Dilworth, Porter & Co. The bill sets forth that prior to January 1, 1880, Joseph Dilworth, George Porter, J. H. Swett and H. M. Rolfe each held one-fourth interest in the business of manufacturing railroad spikes, under the firm name of Dilworth, Porter & Co. By May 1, 1882, all the business of the firm had been settled except the division of a part of the assets, which consisted of about \$5000 worth of personal property, three lots in the Twenty-ninth Ward and the undivided one-half part of a tract of land in the Twenty-second Ward. The plaintiffs ask that the property in the Twenty-second Ward be divided among the heirs of the members of the firm, and that a receiver be appointed to settle the accounts of the firm and to distribute the remaining assets.

INDIANA.

The Indianapolis Foundry Company's shops were partially burned on April 17, involving a considerable loss from fire and water, which was, however, covered by insurance.

OHIO.

Youngstown rolling-mill proprietors are agitating the question of natural gas, for use as fuel in the mills of that city.

The Amalgamated Association committee have not succeeded in obtaining a recognition by the management of the Bellaire Nail Works, and have ordered a strike in the hope of keeping all union men out of the mill.

It is stated that certain rolling-mill firms of the Mahoning Valley, among them being Summers Brothers & Co., are about to experiment with a new steel process, by the use of which the cost of the steel is said to be reduced greatly.

The property of the Steubenville Furnace and Iron Company, which has been offered for sale on several occasions, was sold on April 28 at sheriff's sale, the purchaser being Jasper M. Porter and the price paid \$29,050. The first bid was \$20,000, offered by Colonel Simpson, of Wheeling. The bidding was participated in by W. R. E. Elliott and R. Sherrard, of Steubenville; W. H. Hearne, of the Riverside Mill, Wheeling, and Jasper M. Porter, of Smith Porter & Co., of New Cumberland, W. Va. It is thought that Mr. Porter will turn the works into a terra-cotta manufactory. The property includes about 44 acres of land, 154 acres of coal privileges, a blast furnace, coal shaft, coke ovens, switches, tracks, weigh scales and all buildings, engines and machinery. The property was appraised at \$32,500. The works were built in 1873 at a cost of \$250,000. At the time of sale there was an indebtedness of \$60,000, the balance of which the stockholders will have to make up. The court has confirmed the sale and ordered a deed executed.

It is reported that the Jefferson Iron Works, of Steubenville, contemplate tearing down their two blast furnaces and erecting in their place a large modern furnace which will make Bessemer iron, to be turned into steel at Wheeling and used at the Jefferson works in the manufacture of steel nails.

The Laughlin Nail Company and the Junction Iron Company have formed a corporation to be known as the Laughlin and Junction Steel Works, and under this name will jointly erect a steel works to supply their mills with slabs.

ILLINOIS.

At the works of the Link Belt Machinery Company, Chicago, an application is now being made of paper and iron friction gears of their own manufacture. These gears are said to be quite successful, and the company propose to introduce them to the trade. Several orders are now on hand.

Robert Tarrant, of Chicago, has booked this week an order from Sydney, Australia, for an extra large printing press, upon which it is intended to print a 16-page paper. Among the contracts now being filled at this establishment is one for a press for the Philadelphia Item.

The work of repairing and getting the Union Iron and Steel Company's plant ready for operation will be begun in a few days. It is the announced purpose of the managers to equip the plant in the most thorough manner and make it first class in every respect.

The two blast furnaces of the Joliet Steel Company were blown out on April 13.

Certain of the departments of the South Chicago Rolling Mill Company have been compelled to shut down, owing to a strike by

some 70 furnacemen, pitmen and ladle-liners, who desire an advance of 25 cents per day.

MISSOURI.

The St. Louis Hot-Pressed Nut and Bolt Mfg. Co.'s works are still closed down, and will probably remain so for some time, as the concern is embarrassed by litigation and want of capital.

The Shickle, Harrison & Howard Iron Company continue to melt about 120 tons of iron a day in filling city and other contracts. They are furnishing the pipe for the water-works now building at Belleville, the contract amounting to about 800 tons.

The Mound File Works have been idle, practically, for about a month.

The Helmbacher Forge and Rolling Mills Company have seven puddling and three scrap furnaces in operation, and are also running two hammers.

WEST VIRGINIA.

Top Mill Furnace of the Wheeling Iron and Nail Company has blown out.

HARDWARE NOVELTIES.

The Hub Lawn Sprinkler.

The Hub Lawn Sprinkler, manufactured by M. D. Jones & Co., 76 Washington street, Boston, Mass., is a new style of sprinkler which they have just brought out. The principle on which this sprinkler is constructed is claimed to be new, the water being given a rotating motion in the neck of the sprinkler before it reaches the revolving jet or cap, the holes in which are straight. The neck of the sprinkler has deep spiral threads or grooves cut in it, and as the center of the neck is stopped up with a brass plug the water is forced through these

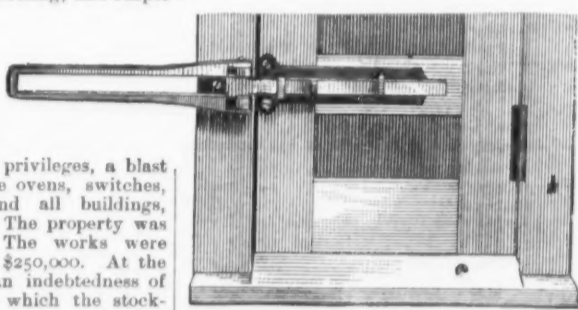


The Hub Lawn Sprinkler.

grooves and given a direction which serves to rotate the cap. The sprinkler is made of hard metal and is said to be more durable than the ordinary article. The slightest pressure of water is said to cause it to revolve, while a heavy pressure will distribute the water over a space 40 feet in diameter. The sprinkler is prepared for use by screwing on a 1/2 or 3/4 inch hose and sticking the pin in the ground. The accompanying cut shows a general view of the sprinkler.

The Perkins Door Check.

The Perkins Door Check, manufactured by the Portsmouth Wrench Company, 130 Congress street, Boston, Mass., has been re-



The Perkins Door Check.—Fig. 1.—The Check Used as a Bolt.

cently offered to the trade. The check may either be used as a bolt or as a chain-bolt. The bolt is of ordinary construction, except that the end is enlarged so as to make it T-shaped. Fig. 1 shows the check when used as an ordinary bolt. The socket consists of two projections that extend over the T-shaped end of the bolt and prevent the door from being opened. When used to serve the purpose of a chain-bolt the slotted piece of metal, which is hinged at the end, is

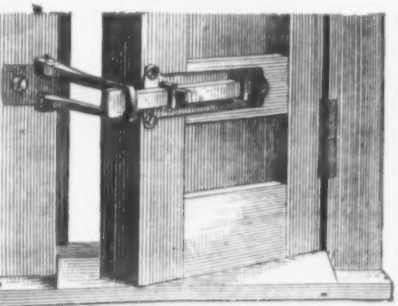
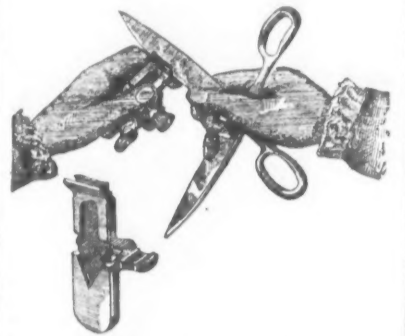


Fig. 2.—The Check Used Like Chain-Bolt.

pulled out perpendicular to the door, and the bolt is then pushed a little further out, so that the head projects beyond the slot. If the door be now opened the bolt will slide the length of the slot, which, acting as a chain, will prevent it from opening more than a few inches. Fig. 2 shows the check when used in this way. The Perkins check is manufactured in bronze, nickel and japan.

Emery's Improved Scissors Sharpener.

The Biddeford Sash Lock Company, Biddeford, Me., are offering to the trade Emery's Improved Scissors Sharpener, a general view of which and the method of using are shown in the cut. The sharpener, which is about 3 inches in length, consists of an iron frame, a file made for the purpose that slips in a groove in the under side of the frame, and a contrivance that fastens the file and holds it in any desired position. The file is single-cut and on one side only. At one end of the frame is a shoulder making an angle with the surface of the file equal to the bevel of a scissors blade. The scissors are sharpened by holding the flat side



Emery's Improved Scissors Sharpener.

of the blade against the shoulder and drawing it back and forth over the file, which thus sharpens the blade without destroying the bevel. The file being movable in the slot, its position can be altered as often as the part in use becomes dulled. This sharpener is neatly made and designed to retail for 25 cents.

LATEST LEGAL DECISIONS.

NEGOTIABLE INSTRUMENTS.

In Cayuga County National Bank of Auburn vs. Purdy this question arose: Do the stipulations in this note destroy its negotiability? "\$366 66. Coldwater, Mich., February 27, 1883. On the first day of November, 1883, we, the undersigned, whose post-office address is Algencoe, County of Branch, and State of Mich., jointly and severally, for value received, promise to pay to E. M. Birdsall & Co., or order, three hundred and sixty-six and sixty-six one hundredths dollars, with interest at 7 per cent. per annum from date. We also agree to pay exchange and all expenses, including attorney's fee, incurred in collecting. Payable at the First National Bank, in Coldwater, Mich. We do hereby relinquish and waive the benefit of all laws exempting real and personal property from levy and sale, and all benefit or relief from valuation and appraisal laws, George R. Purdy, Elanathan George." A recovery was got on the note, and an appeal was taken to the Supreme Court of Michigan, where the judgment was reversed. Judge Champin, in the opinion, said: "There is some conflict as to the negotiability of a note of this character, but the weight of authority is clearly that such notes do not possess the essential qualities of negotiable paper. A promissory note is defined by Judge Story to be 'a written engagement by one person to pay another person therein named, absolutely and unconditionally, a certain sum of money at a time specified therein.' The definition by all text-writers is essentially the same. They are instruments which have long been recognized by commercial usage as the right and liabilities of the parties to the transaction of business, second only to money. Any innovation, therefore, on what has long been considered as settled law in the form and substance of such contracts must evidently tend to uncertainty as to the rights of makers and indorsers, and introduce confusion where stability is of the utmost consequence to the community. The modern tendency to interpolate into such instruments engagements and stipulations not recognized by the law merchant, affecting the certainty as to the amount due and payable thereon, or the time of maturity, or superadding duties to be performed by the maker, or additional obligations other than the payment of a sum certain at maturity, should be discontinued and held to destroy their negotiability and deprive them of the character of promissory notes, and they should be relegated to the domain of ordinary contracts."

FALSE IMPRISONMENT—DEFRADING CREDITORS—EXCESSIVE DAMAGES.

W. had disposed of his property in such a way that his creditors suspected that he intended to defraud them; and one of them, G., got a police officer to arrest him and take him to the city lockup, to force him to settle with him. W. sued G. for false imprisonment and received a judgment of \$3000. He had been confined about four hours. G. carried the case—Woodward vs. Glidden—to the Supreme Court of Minnesota, where the judgment was reversed on the ground that it was excessive. Judge Perry, in the opinion, said: "The arrest was without any possible justification, but there was no violence, and no circumstances of special indignity. A verdict for \$3000 damages was much beyond any right of W. to actual or compensatory damages, and it is evident that the larger part of the amount was intended as compensatory damages. But even damages of that kind must be kept within some reasonable limits. In our judgment the verdict was grossly excessive and exorbitant, and enormously disproportionate to the wrong done by the defendant. We cannot account for it except upon the theory that the jury gave it under the influence of prejudice or passion. We shall therefore reverse the judgment and order a new trial."

SALE FOR CASH—DELIVERY.

A contract arose as to the ownership of 12,000 bushels of wheat, the sellers claiming the grain, as it had not been paid for, it being sold for cash, while those who held claimed that it was their property through

the buyer, from whom they had got it, the seller having delivered it without requiring payment, thereby waiving the right to prior payment. In this case—Fishback vs. Van Dusen—the seller was defeated on his claim, and he appealed to the Supreme Court of Minnesota, when he was again defeated. Judge Mitchell, in the opinion, said: "The weight of authority seems to be that a delivery apparently unrestricted and unconditional of goods sold for cash is presumptive evidence of the waiver of the condition that payment should be made on delivery in order to vest title in the purchaser."

LIBEL.

The Galveston News published the proceedings of a legislative committee which contained defamatory statements affecting W., and he sued the proprietors of the journal for damages in Travis County, in which the paper had a circulation. In this case the defendants claimed: 1. That they could not be sued out of the county in which they printed their paper. 2. That they had the right to publish the proceedings of the committee, this being a public matter; but they were defeated on both grounds. The case—in error, Bels vs. Wren—was carried to the Supreme Court of Texas, where the judgment was affirmed. The Chief Justice (Willie) in the opinion, said: "1. The sale and distribution of the newspaper in Travis County constituted publication at common law, and the circulation of the paper there gave the authorities jurisdiction of the libel. 2. The public are not regarded as having such an interest in proceedings of a legislative committee embodying defamatory matter as will outweigh the necessity for protecting the character of individuals, unless they are proceedings of a legislative or judicial character. This rule includes within itself proceedings of a quasi-judicial character—i. e., before a body having the power to hear and determine matters submitted to its jurisdiction by the voluntary consent of its members. But to be privileged the proceedings must have been not only judicial or legislative, but it must not have been preliminary, ex-parte or secretly conducted."

Burning of the Rail Mill of the Lackawanna Company.

Early on the morning of May 4 fire was discovered in the rail mill of the Lackawanna Coal and Iron Company, at Scranton, Pa. The fire, which originated in the engine-room, spread rapidly, and the valuable machinery it contained was quickly destroyed. The place glowed like a furnace, and the efforts of firemen and workmen were futile until the flames had spent their force and the vast structure collapsed in a mass of red ruins, involving the destruction of \$250,000 worth of property. The origin of the fire cannot be accounted for. A few minutes before 1 o'clock Martin Rife, the night foreman of the place, visited the engine-room, and found everything in order. He then crossed the mill to where the fan engine is situated, about 100 feet distant, and was there but 10 minutes when he saw the engine room full of fire, which had already taken a firm hold of the stout timbers of which the building was constructed. The woodwork was highly inflammable, owing to the oil that had been splashed upon it from the machinery, and in a short time the flames burst through the roof with great force, carrying a shower of sparks and cinders, and scattering them upon the roofs of the dwellings in the immediate vicinity, threatening a general conflagration. The excitement at this stage was intense. Scores of men hastened to the roofs of their houses and had pails of water passed up to them, with which they resisted the threatened destruction of their homes, which were frequently set on fire by the blazing cinders that descended from the roaring rail mill. Thousands of persons had congregated about the burning mill. The fire companies directed numerous streams against the flames and a force of workmen started up the hydraulic system of the converting mill to supplement the efforts of the firemen. The force of the hydraulic machinery was so great, however, that the hose burst under the pressure and was snapped from the hands of the workmen. At 2 o'clock the mill, which was 235 feet long and 100 feet wide, was all ablaze, as was also the rail shed adjoining, which was 150 feet long. Then the girders fell, bringing with them long sections of shafting, and the heavy machinery of the mill was damaged beyond repair. The blooming mill also caught fire, but only a section of the roof was destroyed. The rail-train engines, cambering machine, fan engine and other valuable machinery were destroyed. It is estimated that the damage will not fall short of \$250,000. The mill and its contents were insured for 150,000. It will take more than three months to rebuild the burned mill. By its destruction the company's other mills, as well as their mines, will become idle, throwing nearly 1000 men out of employment.

A Treaty with Colombia.—It is reported that a treaty has been concluded between the Government at Bogota and the Minister of the United States in respect to the security of the transit across the isthmus. This treaty is said to confer on the United States Government certain rights of guardianship of all transit, either by rail or by canal, across the Isthmus of Panama, with special duties of protection to be exercised in accord with the Government of the United States of Colombia. It is understood that by this treaty the Colombian and the United States Governments will co-operate to maintain the freedom of transit against all attack or obstruction, or attempts to obstruct it, and it is believed here that the joint control over the transit route under this treaty will not only authorize but make it the duty of the United States Government to give all required aid in maintaining the transit routes clear for commerce, mail and passengers.

Benj. B. Sherman, for many years president of the Mechanics' National Bank, died in this city on Saturday evening.

Timber Dry Docks.

Although the use of timber is so universal in the United States, it will come as a surprise to many to learn that it is extensively used in the construction of dry docks, and that these structures are much preferred to those built of granite. That wooden docks should cost 3 to 50 per cent. less than those of stone will be readily understood, but until the nature of the North American climate is taken into consideration it will not be realized that they are infinitely cheaper in maintenance. The alternation, however, from hot summers to hard winters proves exceedingly trying to the joints of some docks, and it requires constant repairs to keep them tight. The alternate contraction and expansion rapidly separate the cement from the granite and afford ingress for water, which, on freezing, effects a rapid disintegration of the courses. In 1882 there were but four granite docks completed in the United States, and one was being constructed by the Government in the harbor of San Francisco. At the same date there were 10 wooden "Simpson" docks, so named after the inventor. Three of the stone docks were built by the Government; the fourth, which was the result of private enterprise at San Francisco, has had its exposed surface covered with wood, and that in a locality where the winters are mild.

Some of the principal advantages which the Simpson docks have been found to possess over stone docks as usually constructed are greater accessibility, better facilities for shoring and repairing vessels, better distribution of light and air, dryness and greater safety and comfort to the workmen in freezing weather. The greater slope given to the sides and heads of these docks, and the low, narrow altars used, furnish safe and easy means of access for workmen to the floor of the dock, direct from any part of the coping, and also affords much greater facilities for easily and quickly repairing, receiving and shoring up vessels in dock, conducting the work of repairs, &c. This feature also gives more light upon the ships' bottoms, and the use of wood for floorings and altars is preferable to stone in winter, when the adhesion of ice and snow will be less upon the woods and the discomfort of the damp, chilling air inseparable from the use of stone dock, when filled with frost is largely obviated. Careful investigation shows that extensive repairs and renewals to well-built timber docks are not necessary until after 20 years' service, and then only to the parts above the tide-water: also that the piles, floor and keel timbers, sills and abutments, and the timbering generally below low-water line of the oldest Simpson docks, are still in use and in a good state of preservation, and although the exposed timbers are more or less worn from constant use, and all are deeply water-stained, they are substantially as sound and serviceable as when put in 25 or 30 years ago.

TRADE PUBLICATIONS

Testing-Machines.

Messrs. Fairbanks & Co., of New York, are sending out some new catalogues devoted to their testing machines. In addition to the illustrations and general descriptions of the machines, the catalogues contain descriptions of strain sheets, automatic registering apparatus, suggestions respecting test pieces, and other information. It may not be amiss to state here that, as many of our readers perhaps know, Messrs. Fairbanks & Co. have established a testing department, which has been in operation for some time, and where they are prepared to make all kinds of tests on any material used in construction, such as iron, steel, stone, wood, cement, brick, &c. Their testing machine has a capacity of 400,000 pounds, and can accommodate specimens up to 40 feet in length, so that they are thus prepared to test full-sized members of bridges, roofs and other structures.

The Trenton Engines.

The Phoenix Iron Company, of Trenton, N. J., have sent us an interesting catalogue fully illustrating and describing the "Trenton" automatic engines built by them. Three classes of engines are described, two of them being of the crank-governor type, while the third belongs to the ordinary fly-ball-governor class. Not only perspective views, but also elevations and sections of the engines are supplied, and the reader is thus able to form a thoroughly good idea of the general arrangement and manner of working of the different important parts. As regards general arrangement and attractive features, the catalogue compares most favorably with others of the same general class, and will undoubtedly be examined with a good deal of interest.

Engines and Boilers.

The Erie City Iron Works, of Erie, Pa., have sent us their new catalogue illustrating their portable and stationary engines and boilers, sawmills, &c. The engravings are finely executed, and, together with the satisfactory arrangement of the descriptive matter, contribute largely to the attractive appearance and value of the publication.

The Clerk Gas Engine.

A circular setting forth the advantages of the Clerk gas engine has been issued by the Clerk Gas Engine Company, 1018 Filbert street, Philadelphia, with branch offices at New York and Chicago. An engraving of the engine is supplied, and its essential features are pointed out in a brief description.

Stave, Heading and Barrel Machinery.

Mr. John S. Oram, 155 River street, Cleveland, Ohio, has issued two catalogues, one of them devoted to stave, heading and barrel machinery, and the other to drill presses, engines and feed pumps. Both catalogues are fully illustrated, and will no doubt be of interest to the trade.

Valves and Hydrants.

A small catalogue just issued by the Eddy Valve Company, of Waterford, N. Y., sup-

plies illustrations, descriptions, price lists and tables of dimensions of their well-known valves and hydrants. It also contains a telegraphic code for ordering valves, and will thus prove of considerable convenience to those intending to make purchases of this company.

Engines and Boilers.

The Huber Mfg. Co., of Marion, Ohio, have issued several brightly-colored circulars devoted to their engines, boilers, threshers, &c. They are profusely illustrated, and supply prices and other particulars of trade interest.

An Automotive Tug.

That a current of water can be ascended without the employment of any motive power other than that of the stream itself has long been known to be theoretically possible. Suppose, for instance, that in one of the tug-boats which move by hauling on a submerged chain the driving-pully, instead of being actuated by a steam engine, is driven by paddle-wheels on which the stream impinges; then, if there is a sufficient ratio between the leverage at which the fluid pressure acts and that at which the resistance opposed to the ascending motion of the vessel acts, the vessel will be propelled up stream. Let m be the ratio of the leverage just described, or, more strictly, let m be the ratio, depending on the mode of connection employed, of the velocity of the center of pressure of the paddle floats relatively to the vessel and the velocity at which the chain winds on the driving pulley. Let v be the velocity of the stream and w the speed of the boat; then, according to an abstract of a paper which we find in the excerpt minutes of the proceedings of the British Institution of Civil Engineers it can be shown that

$$w = \frac{(m-1)Ks-S}{(m-1)^2Ks+S}$$

where s is the area of the vertical paddle floats, S the midship section of the boat and K a coefficient depending on the form of the boat. The practical realization, however, of an automotive tug presents great difficulties. The floats must have a large area, but their length is limited by the dimensions of the bridges, &c., the vessel must pass and by considerations of transverse stability. The weight of the paddle-wheels and other conditions limit the width (vertically) of the floats. Still, if an automotive could be realized by which a stream could be ascended at a speed not too much reduced, it would no doubt be applied in many cases—on torrential rivers, for instance, such as the Rhone, where the up-stream navigation is laborious. The abstract then briefly describes an experimental vessel constructed to test the practicability of these ideas. The vessel was 9 m. (30 feet) in length, and 1.1 m. (3.6 feet) in draft. It had two paddle-wheels and a driving pulley on the same shaft, so that the driving force acted directly without intermediate gearing. It was important to be able to vary the ratio designated by m . To attain this the driving pulley was formed of a cast-iron center and six pairs of arms. The two arms of each pair were connected by a bolt which could be fixed at will in one of three series of holes. These bolts formed the angles of a hexagonal surface on which the chain rolled, and according to the series of holes employed this surface was nearly equivalent to that of pulleys 1.6 m., 1.2 m. and .9 m. in diameter (5½ feet, 4 feet and 3 feet). Suppressing the bolts the chain would roll on the nave of the wheel, equivalent to a pulley of .6 m. diameter (2 feet). The ratio m could then be made 1.5, 2, 2½ or 4. The bolts were furnished with three grooves, so that the chain could be taken three times round the drum, and there was a tightening pulley also with three grooves. The chain came into the vessel over a guide pulley, and passed out astern over a second guide pulley. The paddle-wheels carried each 12 floats, 2 m. (6.56 feet) long and .8 m. (2.6 feet) wide. The floats were partly hinged at their outer ends, so as to fall down when rising out of the stream and obviate the tendency to lift the water. To give greater stability, two small lateral hulls are added outside the paddle-wheels, each 13 feet long. To stop the boat, or to make it move down stream or to cause it to turn to either side, vertical sluices were placed in front of the paddle-wheels. These consisted of three vertical iron plates, sliding in grooves, like chimney dampers. By lowering them the action of the stream on the paddles is prevented. By lowering them unequally a dissymmetry is produced in the resistance of the boat analogous to that of a powerful rudder.

A series of experiments with this boat were conducted on the River Seine, France. With a current of 4 feet per second, the chain taken twice over the driving pulley 3 feet in diameter, the boat, carrying 12 persons, ascended the stream at a speed of 33 feet per minute, calculated from the speed of the driving pulley. The adhesion of the chain was, however, insufficient, and the real speed was less. With three turns of the chain on the pulley the speed was 28 feet per minute. With a current speed of 3.6 feet per second, the chain having three turns on a pulley of 3 feet diameter, the boat ascended the stream at 26.4 feet per minute.

Señor Batanero, formerly of the Supreme Court of Cuba, is reported to have arrived in Washington as agent of the Spanish Government with full powers to confer for a new treaty with Spain, which will include the sale of Cuba to the United States.

At the meeting of the Vulcan bondholders on May 2d, the following were the propositions submitted: The Ore and Steel Company proposed to the Vulcan bondholders that in lieu of the old bonds a new bond should be issued, which would be at the same time a first-mortgage bond on the Vulcan Iron Works and a second mortgage on the Pilot Knob mines and works, and, as for the floating debt, an income bond should be issued which would imply the payment of the past-due coupons. As this was not thought to be just and equitable, the following coun-

ter proposition was made: That the Ore and Steel Company get rid of the mortgage on the Grand Tower property by issuing a new bond, which would be a first-mortgage bond on the Vulcan Iron Works and the Tower Grove property and a second mortgage on the Pilot Knob property. It is thought this will be adopted.

William Durst, metal spinner, and George A. Young, machinist, were among the occupants of the "old glass factory" which fell down and was partially destroyed by fire last Tuesday, in Brooklyn. The destruction was complete, and several of the workmen are known to have been killed. H. J. Judd & Co., house hardware goods, are also among the sufferers.

CONTENTS.

	PAGE.
The Whitworth Steel Press.....	1
The Trenton Engines. Illustrated.....	1
Trade Publications:	
Iron Specialties.....	5
Foot-Power Machinery.....	5
Fire Department Supplies.....	5
Experience in the Use of Thick Steel Boiler Plates.....	7
English Letter.....	11
The Boiler-makers' and Shipbuilders' Society.....	11
A Recording Aneroid Barometer.....	13
End Platforms of Freight Cars.....	13
Pelton's Expanding Reamer. Illustrated.....	13
Work on the Aqueduct.....	13
The Henderson Mold for Casting Steel Illustrated.....	15
The History of a Coal Pool.....	15
High Science.....	17
Prospects in the Building Trades.....	17
Britton's Machine for Leveling Sheet Metals. Illustrated.....	19
Iron and Steel in Germany.....	19
The Manufacture of Iron and Compound Armor Plates. Illustrated.....	21
The Week.....	23
Erection of a Concrete Bridge in One Day.....	23
Editorial:	
The Demand of the Amalgamated Association.....	24
Bituminous Coal in Eastern Markets.....	24
The Right to Rescind Iron Contracts.....	24
The Freight Pool Dead.....	24
Quality Guarantees for Tin Plates.....	24
Chili Since the War.....	25
Washington News.....	25
Art Work in Iron.....	25
The Iron Age Directory.....	27
Trade Report:	
British Iron and Metal Markets.....	29
Financial.....	29
Metal Market.....	29
Coal Market.....	29
Chattanooga.....	29
New York Iron Market.....	29
Philadelphia.....	30
Pittsburgh.....	30
Chicago.....	30
Cincinnati.....	31
St. Louis.....	31
Louisville.....	31
Baltimore.....	31
Imports and Exports.....	31
General Hardware.....	32
Standard Brass Goods.—List of Plumbers' Brass Work.....	32
Brick Cylinder Foundations.....	31
Mistaken Prophets.....	35
Good Furnace Work.....	35
English and American Blast-Furnace Practice.....	35
The New Demands of the Amalgamated Association.....	35
Brown, Bonnell & Co.....	35
Foreign Markets.....	35
Current Hardware Prices.....	36
Wholesale Metal Prices.....	38
Industrial Items.....	39
Hardware Novelties:	
The Hub Lawn Sprinkler. Illustrated.....	39
The Perkins Door Check. Illustrated.....	39
Emery's Improved Scissors Sharpener. Illustrated.....	39
Latest Legal Decisions.....	39
Burning of the Rail Mill of the Lackawanna Company.....	39
A Treaty with Colombia.....	39
Timber Dry Docks.....	40
Trade Publications:	
Testing-Machines.....	40
The Trenton Engines.....	40
Engines and Boilers.....	40
The Clerk Gas Engine.....	40
Stave, Heading and Barrel Machinery.....	40
Valves and Hydrants.....	40
Engines and Boilers.....	40
An Automotive Tug.....	40
Metallurgical Notes:	
Chemical Reactions in the Crucible Steel Process.....	41
Electrolytic Refining of Copper.....	41
Plant and Processes.....	41
Philadelphia and Pittsburgh Hardware and Metal Prices.....	41
Boston Hardware and Metal Prices.....	41

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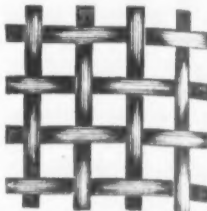
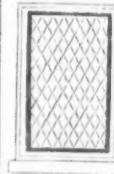
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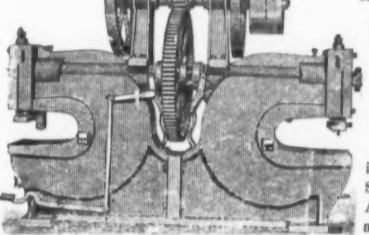
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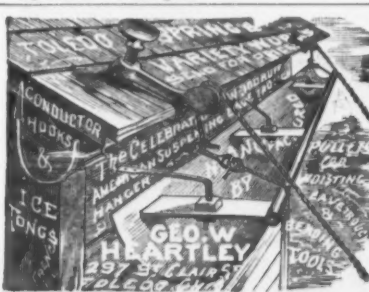
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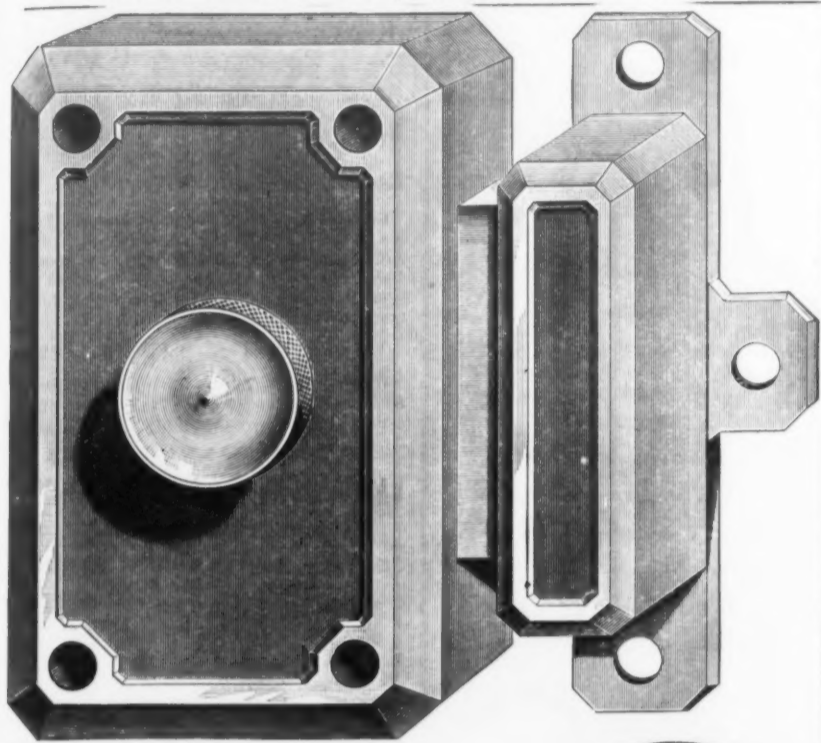
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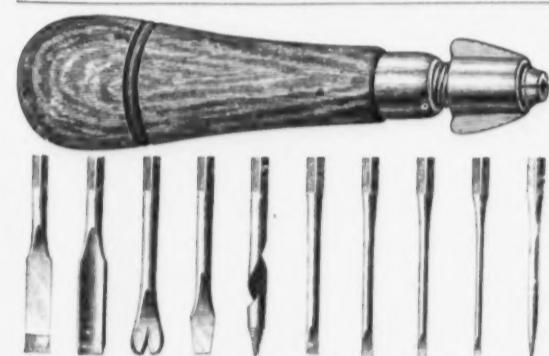
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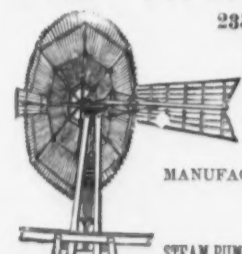
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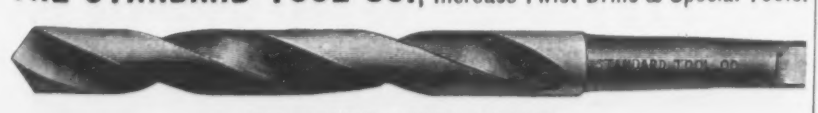


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METALLURGICAL NOTES.

Chemical Reactions in the Crucible Steel Process.

Elaborate as have been the investigations of the chemical reactions in other branches of steel-making, they have been very meager so far as the manufacture of crucible steel is concerned. Aside from the mystery in which that branch of metallurgy has been shrouded by the majority of those engaged in the business, there have been many facts connected with it which chemists have failed to satisfactorily explain, and practical men have come to the conclusion that modern science could do little or nothing to aid them. There is every reason to believe that the work has not been approached in the right way, and it is, therefore, particularly interesting to note the recent researches begun by Dr. Friedrich C. G. Mueller, of Brandenburg, Germany, a scientist who, in co-operation with metallurgists of his own country, has certainly done much good work by his originality. Dr. Mueller has begun in *Stahl und Eisen* the publication of the results of what promises to become a valuable series of papers. We present briefly an outline of the contents of the first of the series. He started in by recognizing the fact that the material of the crucible itself has an important influence upon the chemical composition of the product. Both the refractory clay and the plumbago used in its manufacture vary in composition, and it is even possible that with identical chemical analyses two clays or plumbagos may vary in their effect upon the crucible process. Thus the liability of the silica to reducing influences may vary when it is present in the amorphous or the crystalline form. The reactions may differ with the materials of every different locality, and the numerical results obtained by Dr. Mueller are not, therefore, directly applicable generally. His work was carried out in connection with an Austrian crucible steel works. The plumbago used, as a general rule, contains 75 per cent. of carbon, from 30 to 50 per cent. of it being used in mixture with the refractory clay. The following is an analysis of the plumbago used in the experiments:

	Per cent.
Carbon.....	75
Silica.....	13
Alumina.....	8
Oxide of iron.....	1.7
Line.....	3
Moisture.....	2

The clay, which comes from the Polatinate, was found by analysis to contain:

	Per cent.
Silica.....	50.04
Alumina.....	33.64
Oxide of iron.....	2.81
Potassa.....	3.19
Magnesia.....	.48
Moisture.....	10.13

The crucibles for the experiments were made exactly in the same way and under the same conditions as usual at the works, and were charged at the same time as other crucibles and put into the Siemens furnace at the same time. The material used was melted at least two times. The first melt was cast into an ingot, broken, and, after taking a sample of the metal, was again melted in crucibles of the same make. This not alone afforded a check, but furnished additional data, because a material more highly charged with silicon entered the process after every melt. The following are the results of the series of experiments made:

A.—Crucible made of 3 parts of plumbago, and 3 1/2 parts of clay.
1. A pig of Styrian white iron having the chemical composition given in *a* was melted once *b*, twice *c* and three times *d*.

	Carbon.	Mang.	Si.
<i>a</i>	3.503	2.088	.075
<i>b</i>	3.799	1.91	.078
<i>c</i>	3.773	1.856	.075
<i>d</i>	3.636	1.894	1.069

The results showed the gradual change to gray iron.

2. Puddled steel having the composition *a* was melted once *b*, and twice *c*.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.089	1.103	1.325
Manganese.....	.31	.224	.224
Silicon.....	.021	.398	.628
Phosphorus.....	.012	.02	.028
Sulphur.....	None	None	None

3. Puddled iron having the chemical composition shown in *a* was melted once *b*, and twice *c*.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.048	.251	.35
Manganese.....	.083	.08	.078
Silicon.....	.021	.081	.257
Phosphorus.....	.041		

While the ingot after the first melt was full of blow-holes, it was sound after the second melt.

B.—Crucible made of 5 parts of plumbago and 1 part of clay. In the first two series of experiments the whole crucible was made of this mixture. It was found, however, that after every melt the crucible was perforated above the level of the steel, so that the gases of the fire had access to the contents of the crucible. Then two additional series of tests were carried out with crucibles only the lower part of which was made of 5 parts of plumbago to 1 part of clay, while the upper section was made of the usual mixture of equal parts of the two materials. These crucibles were not injured.

4. Puddled steel having the chemical composition *a* was melted once, *b*, and twice *c*.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.015	1.13	1.451
Manganese.....	.214	.02	.192
Silicon.....	.031	.313	.622

5. Puddled iron having the chemical composition *a* was melted twice, *b* and *c*.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.048	.72	.673
Manganese.....	.114	.565	.591
Silicon.....	Trace	.29	.624

The first melt was porous, the second yielded sound metal.

6. Puddled steel melted twice. One per cent. of manganese ore was added at every melt.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.011	1.308	1.623
Manganese.....	.141	.565	.738
Silicon.....	.049	.303	.35

7. Puddled iron was melted twice, the first melt being porous.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.04	.671	1.396
Silicon.....	.023	.302	.658

C.—English plumbago crucibles, containing about 50 per cent. of carbon, which stood

well, being fit to use over twice or three times.

8. Puddled steel melted twice in new crucibles.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	1.125	1.148	1.106
Manganese.....	.179	.35	.141
Silicon.....	.023	.35	.993

9. Puddled iron *a* melted once; *b* in an English crucible already used, and melted for the second time, *c* in the same crucible. In both cases the metal was porous.

	<i>a</i> .	<i>b</i> .	<i>c</i> .
Carbon.....	.09	.324	.39
Manganese.....	.093	.02	.101
Silicon.....	.019	.302	.393

These are the facts gathered thus far by Dr. Mueller. He reserves the presentation of an elaborate theory of the crucible steel melting process for a future occasion, when further experiments similar in character have been carried out with other crucible materials. He puts forward, however, the following conclusions:

In plumbago crucibles like those of the Series A, and all those containing even more graphite, both hard and mild puddled steel absorbs nearly .3 per cent. of silicon, and about .2 per cent. of carbon for Series A. In Series B the quantity of carbon absorbed is greater. Manganese is indifferent. When manganese ore is added, manganese is reduced by the steel, the absorption of silicon being simultaneously reduced. When the fire gases have access to the steel, only the carbon contents are affected.

The absorption of silicon is explained by the following formula:



Dr. Mueller promises to investigate the questions affecting the reduction of the silica of the crucible material more thoroughly. As an instance of crucible material which does not appear to be subject to this reaction he cites a case of crucibles tried at Bochum. They are made there of a mixture of Rhenish clay containing 40 per cent. of alumina and 45 to 50 per cent. of silica, and of 5 per cent. of coke. A trial melting conducted by Herr Wasum showed that 70 carbon steel had absorbed only .04 silicon.

Another point to be observed in connection with the reaction quoted is the generation of carbonic oxide, the quantity being 1.5 times the volume of the steel for every .1 per cent. of silicon introduced into it. This, Dr. Mueller urges, does not make the steel porous. The "killing" of steel is said to be due to the absorption of silicon and carbon, and the gases are not expelled by what would be like boiling. In confirmation of this Dr. Mueller quotes the following experiment: A lot of basic steel was cast directly into a red-hot crucible, put at once into a crucible steel furnace and kept molten for three hours. When poured this steel rose and sprouted more than the basic steel, which was cast into ingots at once. A comparison of the analyses of the basic metal and of the steel kept molten in the crucible (*b*) showed the following results:

	<i>a</i> .	<i>b</i> .
Carbon.....	.015	.02
Silicon.....	.011	.023
Phosphorus.....	.023	.034

The absorption of carbon shown throughout in the series quoted above is even greater than is apparent, because the reduction of silica to silicon involves the conversion of .086 carbon for every .1 per cent. silicon introduced with carbonic oxide.

Electrolytic Refining of Copper.

Dr. Paget Higgs has continued in the Engineer his report of the practice at different works in England and on the Continent in the electrolytic refining of copper. He summarizes the thickness of deposit in a week's work of 156 hours as follows:

	Inch.
Maximum deposit, chemically pure anodes.....	.067
Sprague's results, good deposits.....	.02 to .24
Gramme's results.....	.006 to .025
Hamburg Works.....	.06
Blache Works.....	.02
Marseilles Works.....	.07
Selby Oak Works.....	.06

Dr. Higgs adds: The purity of the copper obtained depends on the continuity of the operation, on the distance between the electrodes, and on the purity of the solution and of the anode. But, considering circumstances, it would appear that the results, good or bad, from all the works quoted are very closely similar when the deposit does not exceed the rate of .08 inch per week.

Plant and Processes.

A pipe coupling for natural-gas mains has been recently patented by W. W. Spear, of Pittsburgh, Pa. This coupling consists of a piece of cast-iron tubing, lined with sheet or cast steel. The lining is secured by welding or otherwise. Two circumferential grooves within the tube and near the ends thereof serve to receive a suitable packing. The sections of pipe to be united are introduced into the ends of the coupling as usual. The steel lining is said to prevent any passage of the gas through the coupling. If desired, the coupling may be made in two halves, which are joined by draw-bolts passing through lateral flanges. The claim of the patent covers a pipe coupling which is lined with steel.

T. Kelley, of Maynard, Ohio, is the assignee of the patent right in a new coke oven. The oven is open at both ends and is provided on opposite sides with suitable guides for the sliding doors. The oven gradually widens or tapers outward from its front end to its rear or discharge end. By this construction the discharge of the contents is claimed to be facilitated, and any clogging of the coke is said to be obviated. Five more or less flues or openings extend through the roof of the furnace. The floor is inclined downward from one end, and is provided with a series of longitudinal rails. These rails serve to guide the pusher and prevent the floor from being scraped or damaged. Within the space between the rails the wood to kindle the fire is placed. This space forms a flue underneath the slack, which operates to carry off the sulphur.

A steel plate for elliptic and semi-elliptic springs has been patented by H. B. Dye, of Marquette, Mich. This plate is made with a longitudinal rib at its upper face and with a corresponding groove on its lower face. The groove is located directly beneath the rib. In fitting the plates on top of each other the rib of a lower plate is made to enter the groove in the plate directly above. If desired, two or three ribs and grooves may be formed on each plate. These plates

will not slip when interlocked, and are claimed to produce a spring of greater elasticity for a like weight of material.

A furnace for the treatment of copper ores has been patented by J. F. Coignet, of Lyons, France. A blast of air is allowed to escape from the end of a tuyere at a moderate depth under the melted material. This blast burns out the sulphur and oxidizes the iron, transforming it into slag. The slag floats on the surface of the denser matter. When the slag obtains a certain height above the tap-holes the tuyere is withdrawn, and the force of the blast is gradually diminished. The material is allowed to remain at rest for a few minutes, during which time any of the denser metal which may have been thrown up by the agitation has time to find its way down. The slag is then removed and the tuyere is again introduced for a repetition of the operation.

R. McQueen Weir, of Boone, Iowa, has patented an attachment for furnaces, more particularly adapted for furnaces which are used for heating buildings. Around the inner wall of the furnace there is laid a coil of pipe, the upper end of which projects above the top of the furnace. The lower end of the coil is closed and is provided with a series of perforation, which are located just above the fire. The outer air is drawn into the coil through the top opening, and as it passes downward, it is heated till the oxygen is separated and emerges from the perforations. The oxygen mingles with the flame and gases from the fire, and thereby produces a more perfect combustion.

J. S. Seibert, of Pullman, Ill., has patented a metallurgical gas furnace for puddling, heating and treating iron. This furnace has the gas and air flues so arranged that it may be used either as a gas furnace proper or as a direct draft furnace. The gas producer communicates with the combustion chamber by an arch-shaped opening in the dividing wall. Behind the combustion chamber there is located a gas receptacle, to which gas is admitted from the gas chamber. A damper controls the quantity of gas admitted. Hot-air flues pass from the combustion chamber into the furnace alongside of gas flues. When the furnace is to be used as a gas furnace proper the opening between the gas producer and the combustion chamber is closed and the damper is opened. The gas passes through a soot-screen to the gas receptacle, from where it enters the furnace, igniting and mixing therein with the hot air from the combustion chamber. A direct-draft furnace is formed by closing the damper and allowing the gas from the producer to pass into the combustion chamber, so as to ignite therein, and to pass with the hot air through the hot-air ports only into the furnace.

A new method of preventing the metal from entering the tuyeres of a Bessemer converter has been patented by J. F. Wilcox, of Pittsburgh, Pa. The inventor maintains a sufficient minimum pressure in the tuyeres, while the metal is not under blow, to counterbalance the pressure of the metal in the converter. A pressure of from 5 to 6 pounds per square inch is kept up in ordinary converters. In carrying this invention into practice the lower or removable part of the converter is provided with a blast trunk connecting with all of the tuyeres. This trunk has a single detachable connection with the blast-pipe which conducts the blast from the engine. Thus it is necessary to disconnect only one joint when the bottom is removed for renewal or repair. Another advantage is that the converter is clear of valves and their operating appliances.

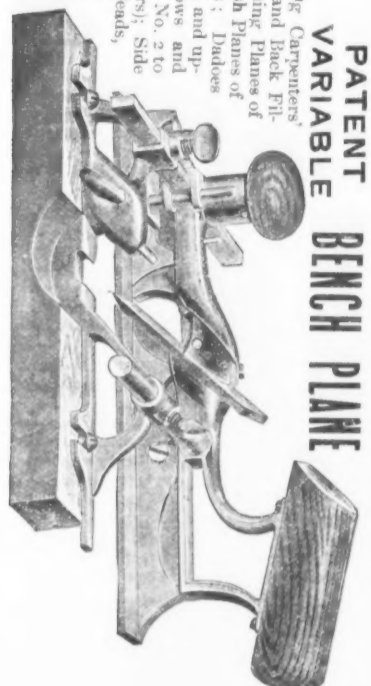
A. J. Moxham, of Johnstown, Pa., has patented a rolling mill for rolling street railway rails. The mill is so arranged that it is capable of making at least three different forms of rails without any change of rolls. Three trains of rolls are employed in this mill, and each train contains six passes. The first and second trains are termed the "roughing rolls," and have for their object to shape the web and leave sufficient material at the edge to form the different heads. The third train is composed of the finishing rolls, which give the desired finish to the head. The bar of metal is first put through various passes of the roughing rolls and then through two passes of the finishing rolls. The claim of the patent covers the process of first rolling the hot blooms through the same series of passes to form a bar of primary shape, common to all the subsequent forms, and then rolling it in specially grouped finishing passes.

A machine for forging axles, spindles and other articles of cylindrical or tapering shape has been patented by M. E. Shay, Fordham, N. Y. The object of the machine is to twist the fibers of the blank as the same is drawn out, and to thereby increase its toughness. The machine carries an upper stationary die, constructed to resist pressure, and a lower cylindrical spirally-grooved roller die, secured to a frame which may be moved up or down. The heated blank is inserted through an open guide between the dies in a position parallel to the axis of the lower die. This die is then rotated to draw the inner end of the blank against the back of the upper die. The spirally corrugated surface of the lower die will act obliquely on the fibers of the blank in order to twist the same, much in the same manner as rifle barrels are made. During the operation of the dies the blank is rotated by the lower die, and a sufficient resistance is thrown upon it by the fixed die to cause the corrugated surface of the roller to crush into the metal and draw it out.

A rolling mill for rods, patented by J. T. Rowley, of Johnstown, Pa., employs two sets of finishing rolls in conjunction with two sets of finishing rolls. The ovals give the rod its last change of shape before reaching the finishing rolls which give the rod its final shape. In operating the mill the speed of the finishing rolls is decreased, while the speed of the roughing section is increased. In contradistinction to the ordinary mills, the inventor proposes to run the two sets of finishing ovals and finishing rolls slower, and to use two sets of finishing rolls instead of one. By the present construction of mills it is necessary to run the rolls at a sufficient high rate of speed to enable them to take up the finished rods from the floor, and thereby the work is claimed to be frequently damaged. The new mill, it is claimed, will turn out a greater amount and a better quality of work.

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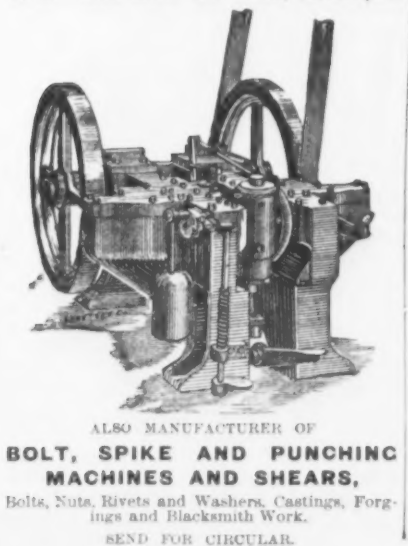


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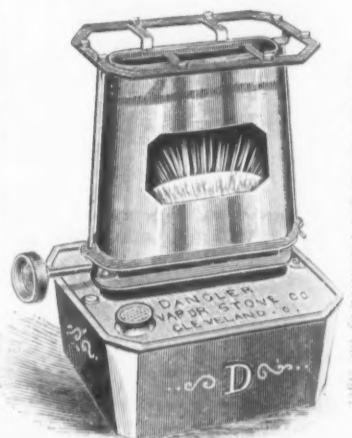
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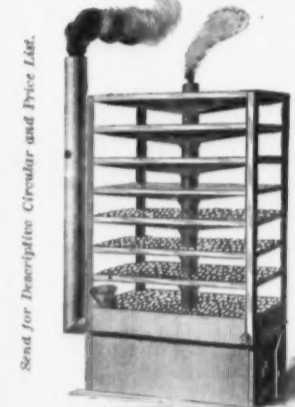
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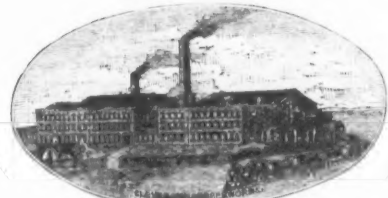


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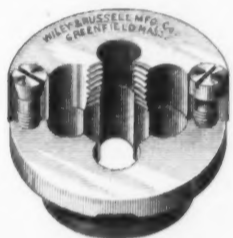
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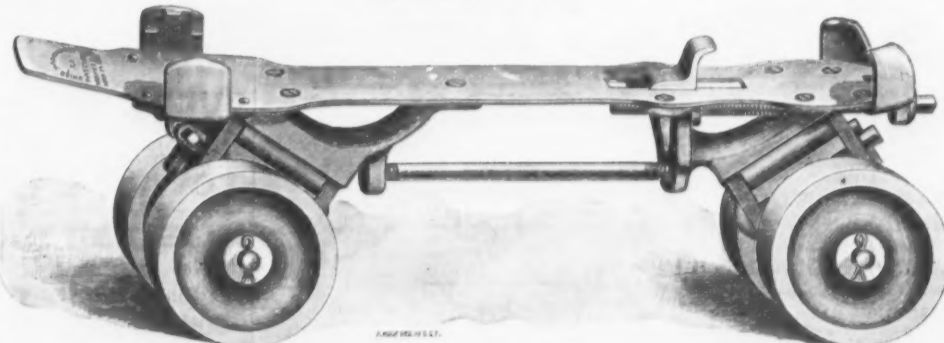
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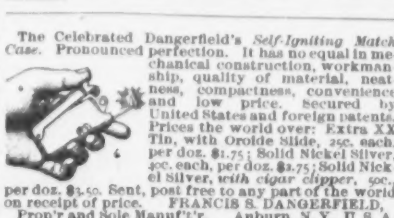
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161

G H K, of Fig. 426, is presented one of the sets of conditions which necessitate a change of profile, in either the horizontal or raking molding, in order to accomplish a miter joint at the point indicated by I II in the plan. In other words, the conditions are such that with a given profile, as shown by A' in the raking molding, the horizontal molding forming the return will require to be modified, as shown by the profile A', in order to form a miter upon the line I II in the plan; or, if A' is established, A' will have to be constructed to correspond with A'. The reason for this is quite obvious. The distance across the raking molding at right angles to its lines is greater than the corresponding distance across the return molding at right angles to its lines; therefore the projection in the cornice, as shown by the profile A', must be distributed through a smaller space than is shown in the profile A'. In this problem we assume that the pitch of the raking cornice B C is established and that the profile A is given, and from these parts it is required to develop the modified profile. We have the choice of placing the normal profile in the horizontal return and making the raking profile correspond with it, or of placing the normal profile in the raking molding and making the profile of the horizontal molding agree with it. Although the principle upon which these operations is performed is identical in both, the demonstration will be made clearer if each is fully illustrated independent of the other. In this problem and the following one, therefore, we show the several steps necessary to take in modifying the profile, and in cutting the several patterns required to form the structure indicated by the elevation and plan. First we will assume that the normal profile occurs in the raking cornice, and that the horizontal profile is to be modified to suit it. We then proceed as follows: Draw a representation of the normal profile in the raking cornice, as shown by A', placing it to correspond to the lines of the cornice, as shown. Draw another profile corresponding to it in all parts, directly above or below the foot of the raking cornice, in line with the face of the new profile to be constructed, placing this profile A so that it shall correspond with the lines of the horizontal cornice. Divide the profiles A and A' into the same number of parts, and through the points thus obtained draw lines, those from A' being parallel to the lines of the raking cornice, and those from A intersecting them vertically. Through these points of intersection trace a line, which gives the modified profile, as shown by A'. Then A' is the profile of the horizontal return, indicated by G H I F in the plan. It is also the elevation of the miter line I II of the plan for the several patterns involved. We therefore proceed as follows: At any convenient point at right angles to the lines of the raking cornice lay off the stretchout M N of the profile A', through the points in which draw measuring lines in the usual manner. Place the T-square at right angles to the lines of the raking cornice, and,

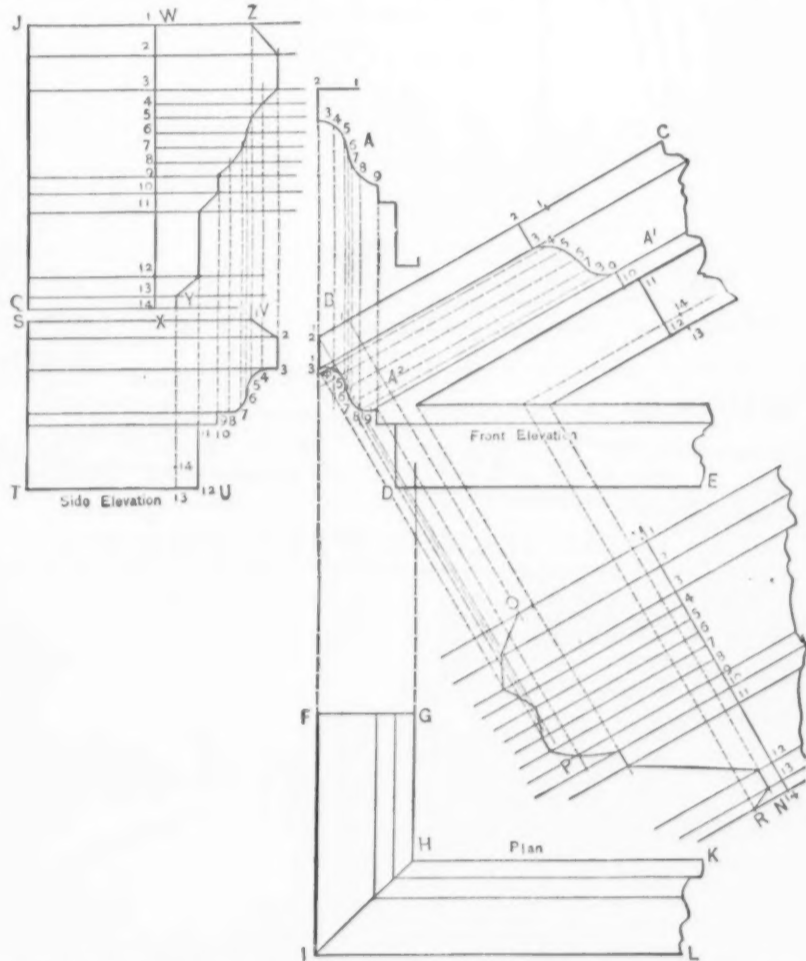


Fig. 426.—To Ascertain the Profile of a Horizontal Molding Adapted to Miter with a Given Inclined Molding at Right Angles in Plan, and the Several Miter Patterns Involved.

and Technicalities; (2) Drawing Tools and Materials; (3) Geometrical Problems; (4) The Art and Science of Pattern Cutting; and (5) Pattern Problems. These titles sufficiently indicate the subject matter of the several parts.

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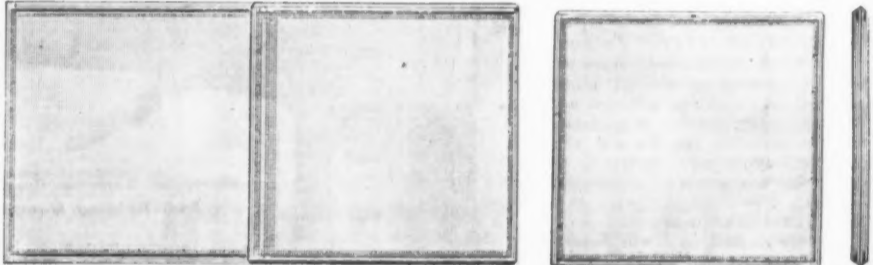
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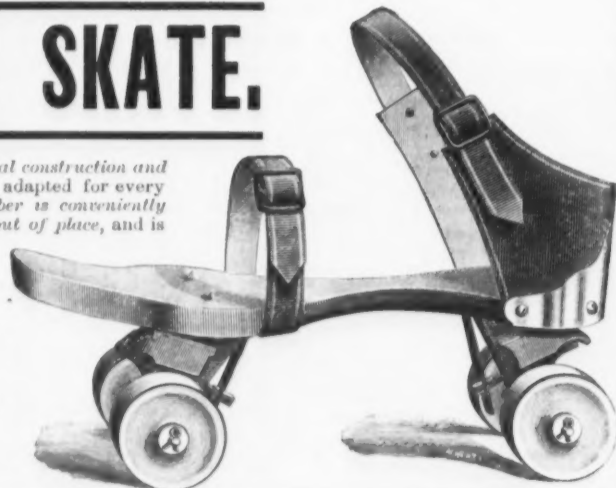
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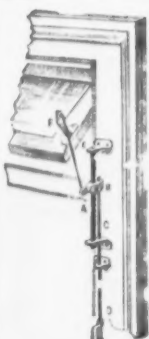
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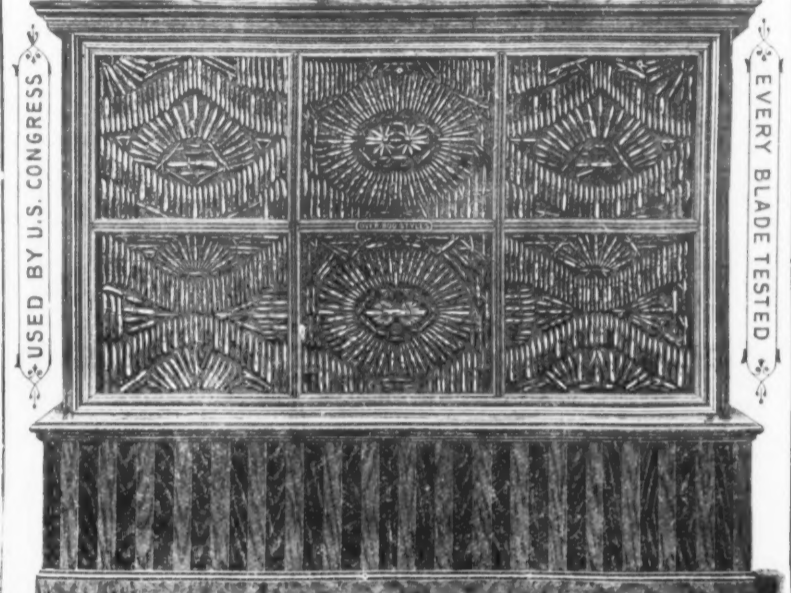
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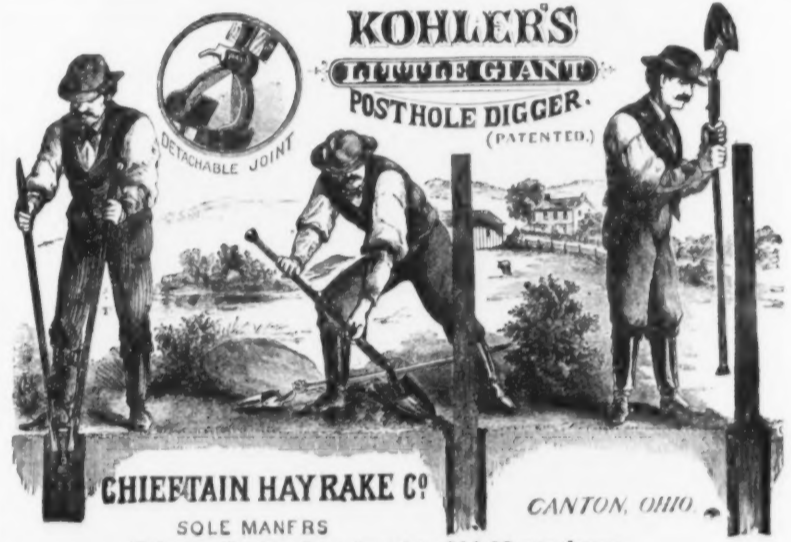
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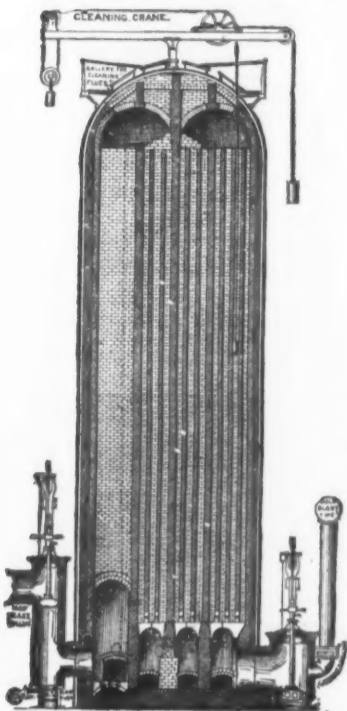
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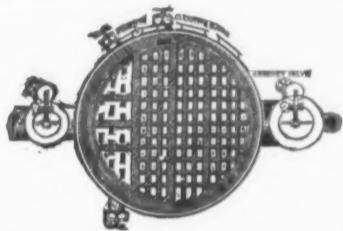
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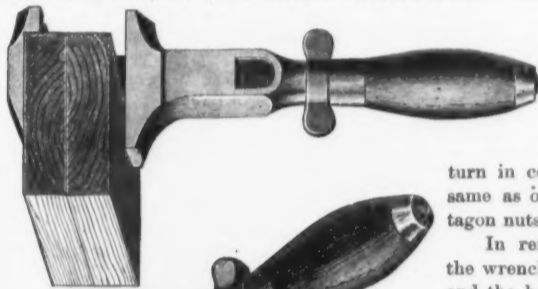
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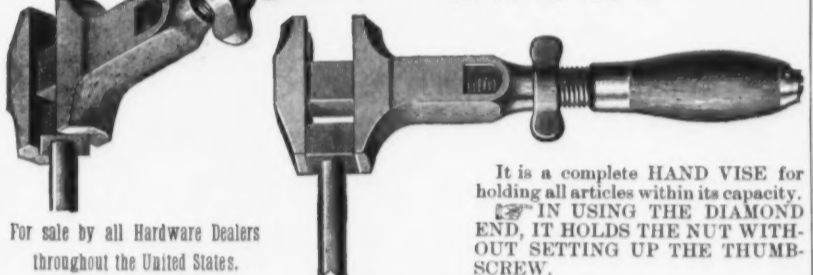
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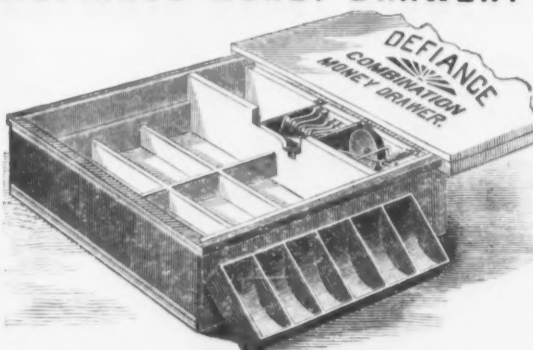
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We claim that the Defiance Money Drawer is the best drawer in market. We claim this because, FIRST.—The lock is simpler, stronger and more easily changed, and, as the five keys under the drawer work on a system of weights instead of spiral springs, the ones in use do not work easier than the others, thus giving better security and greater durability. SECOND.—There are six spaces for bills instead of four, and they are more conveniently arranged than in any other drawer. THIRD.—A separate compartment for private papers is afforded. FOURTH.—The space will save fully one-third of the time in making change. The six compartments are all together, on a line, so that the drawer need be opened only four in five, and the bill compartments are not exposed. FIFTH.—The material, workmanship and finish are equal to the best. Also sole manufacturers of Knight Cheese Safes, Perfected Oil Tanks, Excelsior Bolt Pulls, "Knock Down" Broom Racks, &c.

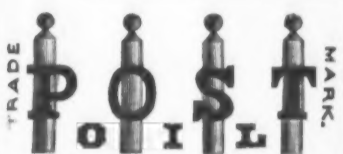
POST'S

WATERPROOF BELT OIL

AND LEATHER

PRESERVATIVE,

For Wet and Dry Leather Belting.



Registered in the U. S. and Great Britain.

THE STANDARD BELT OIL OF THE WORLD.

Leather dressed with this oil will not crack or rot, as heat, cold, water or gas has no effect on it. It will spread one-third further and last much longer than any oil for the same purpose. It never turns rancid; will keep in any climate. Belts may be run in water at one end and a hot room at the other, and still be soft, dry and pliable. Warned not to start glue-laps or gum on belts or pulleys, and to keep the surface perfectly smooth.

Beware of Imitations Sold at a Cheaper Price, the Color of which is well calculated to Deceive.

In their Treatise on Machine Belting, J. B. HOYT & CO. speak of Post's Oil as follows:

OILING OF BELTS.

"Care should be taken that belts are kept soft and pliable. For this purpose we decidedly advise the use of 'POST'S WATERPROOF BELT OIL AND LEATHER PRESERVATIVE.' When applied as directed, it makes the belt smooth pliable and adhesive, and causes it to hug the pulley closely, so that no power is lost from lack of pulley contact. It possesses excellent preservative qualities and also renders the leather more impervious to dampness than any article or preparation we know of."

"Moisture should not be allowed to penetrate the laps or joints, as it will dissolve the cement and cause the laps to come apart."

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W. H. Billingham & Co., Louisville, Ky.
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Cameron & Barkley, Charleston, S. C.
Townner, Landstreet & Co., Baltimore, Md.
C. E. James, Chattanooga, Tenn.
C. B. Choate, East Saginaw, Mich.
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If you cannot get POST'S OIL from your Belt Maker, send direct to us and we will see that you do get it.

Price, Per Gallon, \$1.50.

10 gallons, \$15.00.....boxing and can, \$1.00.
25 " 37.50no charge for 1/4 Bbls.
50 " 75.00 " " Barrels.

We solicit Correspondence from Dealers in Manufacturers' Supplies.

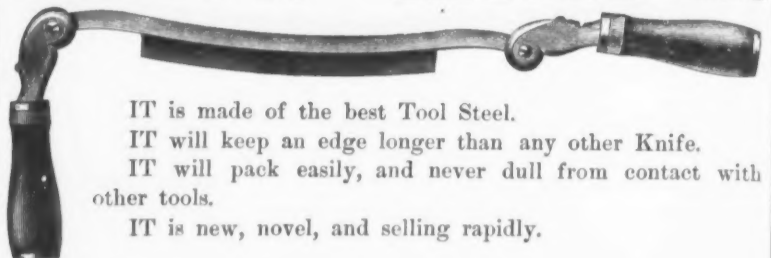
E. L. POST & CO.,

No. 10 Peck Slip, N. Y.,

SOLE MANUFACTURERS.

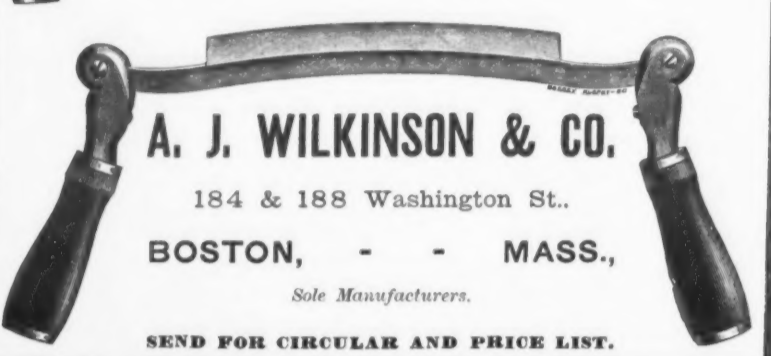
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Folding and Adjustable Handle

DRAW KNIFE.



IT is made of the best Tool Steel.
IT will keep an edge longer than any other Knife.
IT will pack easily, and never dull from contact with other tools.

IT is new, novel, and selling rapidly.



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Solid Cast Steel Hammers.



All Hammers made by us are of a superior quality of Cast Steel, and the Handles of the best selected Hickory.

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Desiring to put the best Hammer on the market, each one is thoroughly tested before leaving the factory, and those stamped "HARTFORD" are warranted.

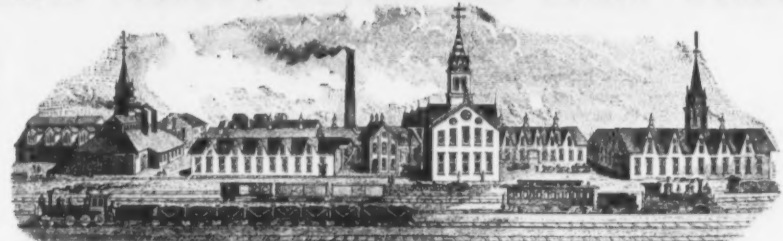
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HIGH-SPEED BLOWING ENGINES, PUMPS FOR MINES AND ALL PURPOSES.

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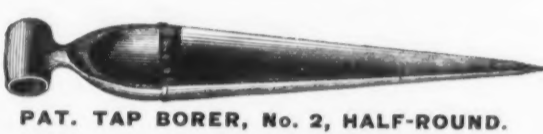
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THE MODEL EXPANSIVE BIT.
(Ives' Patent.)

CAST STEEL RAILROAD AUGER.



PAT. TAP BORER, No. 2, HALF-ROUND.



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JENNINGS' DOWEL MACHINE BIT,
With Round or Square Shank.

Solid Cast Steel Augers,
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Ring Augers,
Boring Machine Augers,
Railroad Augers,
Millwright Augers,
Cotton Augers,
Adjustable Hollow Augers,
Expansion Hollow Augers,
Spike Trimmers.

Tap Borers,
Expansion Bits,
Circular Lip Bits,
Jennings' Bits,
Sugar Bits,
Gimlet Bits,
Counter Sinks,
Extension Bit Holders,
Bit Braces,
Auger Handles,
Brill Chucks.



EXPANSIVE HOLLOW AUGER, No. 1.
(Ives' Patent.)

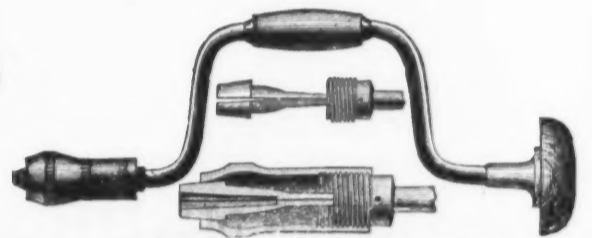
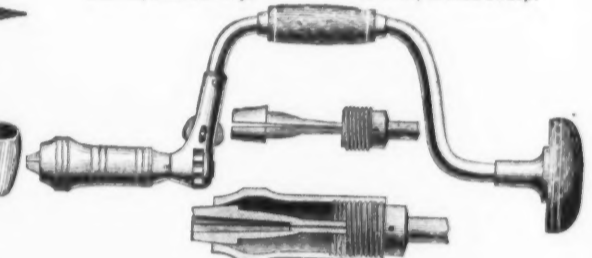


HOLLOW AUGER,
Old Pattern.



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No. 120, 8-inch sweep. No. 121, 10-inch sweep.



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This Bit Brace is constructed upon an entirely new principle
its socket and grasping jaws are one solid piece of metal.
Not a pin, spring or fastening to get misplaced or out of
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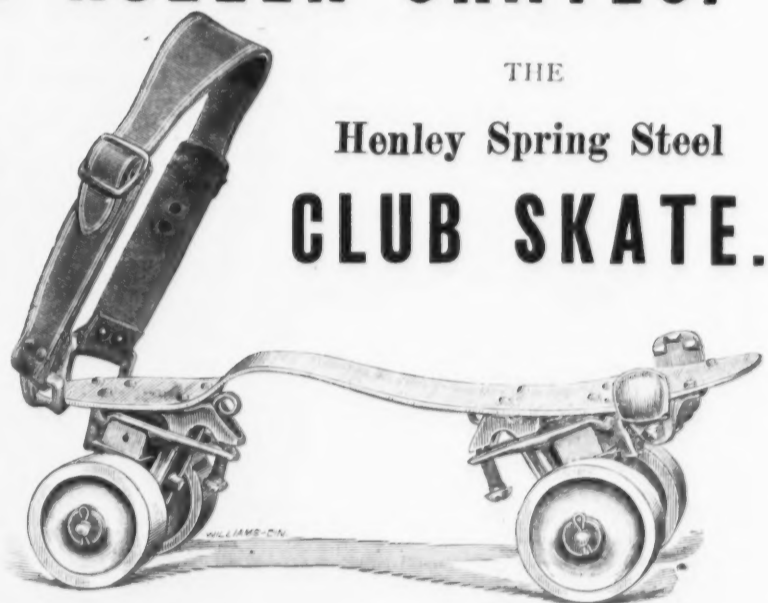
M. C. HENLEY,
Patentee and Manuf'r.

FACTORY AND OFFICE:
Nos. 523 to 533 No. 16th St.,
RICHMOND, IND.

MENTION *The Iron Age*.



THE
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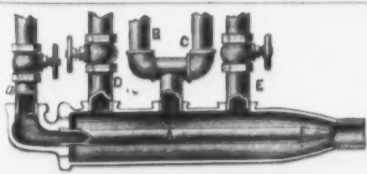


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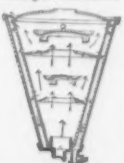
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Will stop all snapping and cracking noises in steam
pipes; increases heat in dry rooms. The only fitting in
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CHAPMAN'S
Improved Steam Trap.

For Heating Apparatus, Dry
Rooms, Breweries, Factories,
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Pipes leading to Steam Pumps
in Mines, Canning Houses, &c.

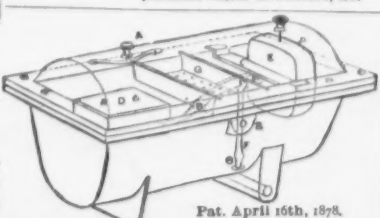
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WATSON'S STEAM PRESSURE
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For reducing and giving an
even pressure, regardless of
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For Paper Mills, Heating Ap-
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Patented Reversible, Self
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For Horsemen and Barbers.

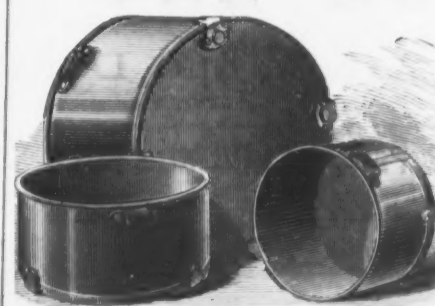
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FIRST QUALITY CLIPPER
1. IS NICKEL PLATED.
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The Buckeye Grain Measure, is light, strong,
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firmly secured in place, first, by the annular
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by the combined malleable clamp and
foot, which is securely fastened to the side and
bottom, the whole forming a combination
which effectually prevents its being forced
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japanned and galvanized iron, and will supply
the want of a good measure, long experienced
by every farmer.

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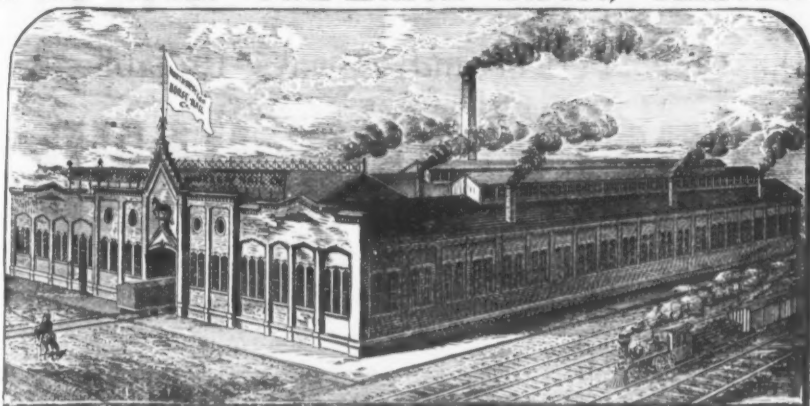
NORTHWESTERN HORSE NAIL CO.,

No. 88 West Van Buren Street, CHICAGO.

Regular Head.

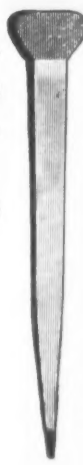


OUR NAILS are manufactured from the finest brand of Swedish Iron, of which we use the entire product.



IN QUALITY, uniformity of shape and style, they are unequalled. They are the safest nail to drive.

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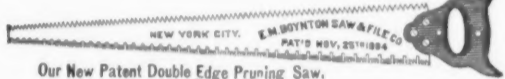
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THE CUT BELOW represents our latest patent "Wonder" Cross-Cut Saw, of which style of teeth we shall use for our Cross-Cut One-Man Pruning and Buck Saw. This tooth has all the direct fast cut of the Lightning, combined with the clearing teeth of the Champion, making it, as its name indicates, the Latest Wonder, and by actual test we decide an advantage of 20 per cent. over our former world-renowned Lightning Saw. Having newly organized January 20th, 1885, as the E. M. Boynton Saw and File Co., we shall be prepared to fill any orders for the above, as well as for goods which have been furnished our customers throughout the world for the last 14 years.



THE WONDER CROSS CUT SAW.

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BOYNTON BROS.
LATEST PATENT.
E. M. BOYNTON, PRESIDENT.
C. W. BOYNTON, VICE PRES.
N. Y. CITY.

PATENTED NOV. 25TH 1884.

Respectfully yours,
E. M. BOYNTON SAW AND FILE CO.,
P. O. Box 2652. 99 Chambers Street, NEW YORK.

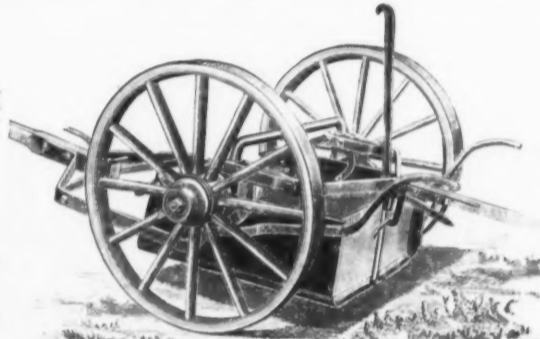
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Has great advantages over all others. It has more capacity, is easier handled by man and team, and the only Wheel Scraper made that does not make the horses' necks sore. It has all the latest improvements and exceeds any thing of the kind ever offered to the trade. Good on long and short hauls. Three sizes, 6, 12 and 16 cubic feet.

HASLUP'S ALL STEEL DRAG SCRAPER

Beats all others for capacity, durability, strength and light draft. Being ALL STEEL (except wood handles), are lighter, stronger and better made than any other. Three sizes. Also Township and Railroad Plows.

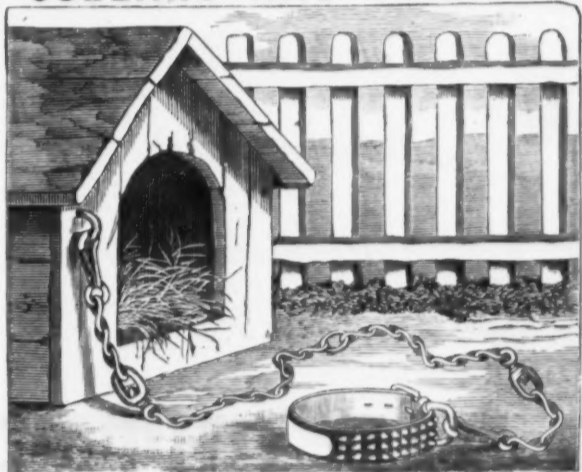
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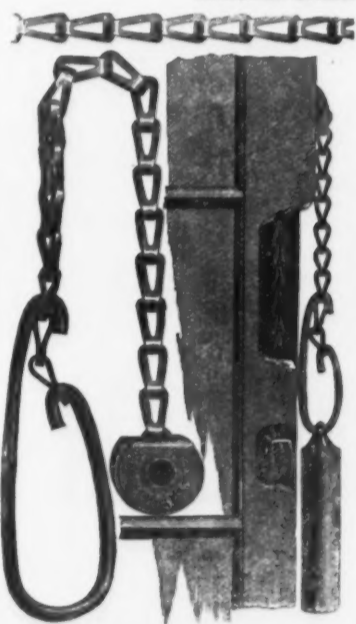
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Centennial Award. "Superior in Every Respect." This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."

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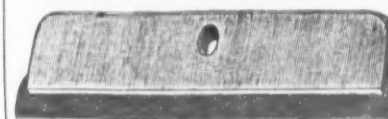


SIMPLE,
USEFUL
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STAPLE
AS
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OR
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Beware of Infringements.

FLOOR SCRUBBERS.



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BORAX.

Manufacturers and Jobbers will consult their interests in obtaining supplies of Powdered and Concentrated Borax, in 50 lb. lots and above, by communicating with the undersigned, the successor of Smith Bros., the oldest and largest producers in the United States. My Concentrated is particularly valuable to the Hardware and Blacksmith Trade, being much drier than refined Borax. Correspondence solicited.

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Genuine Green Paper Brand Washita Stone is the Best

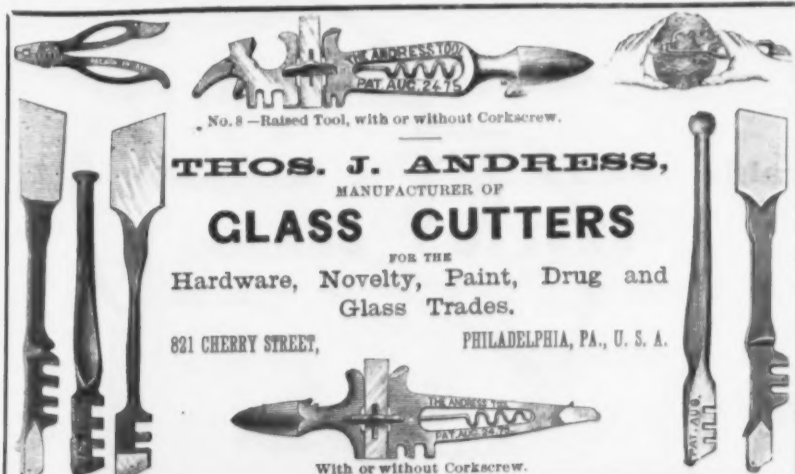
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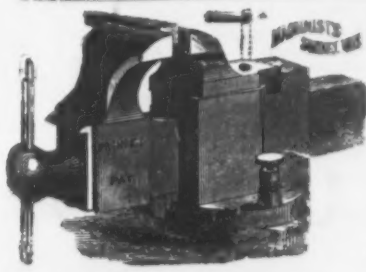
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J. M. WORTHINGTON, V. Pres.

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FOR THE
Hardware, Novelty, Paint, Drug and
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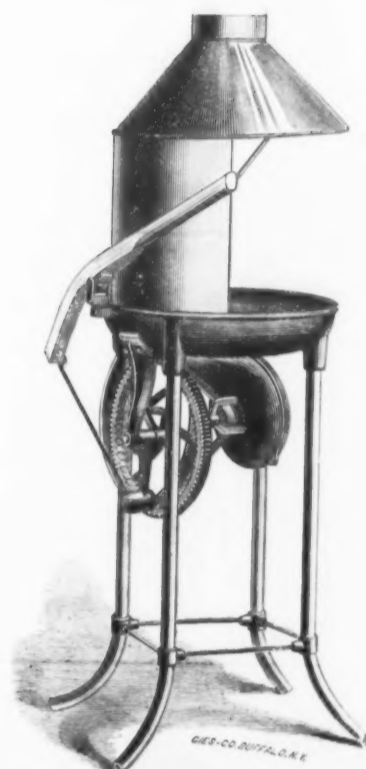
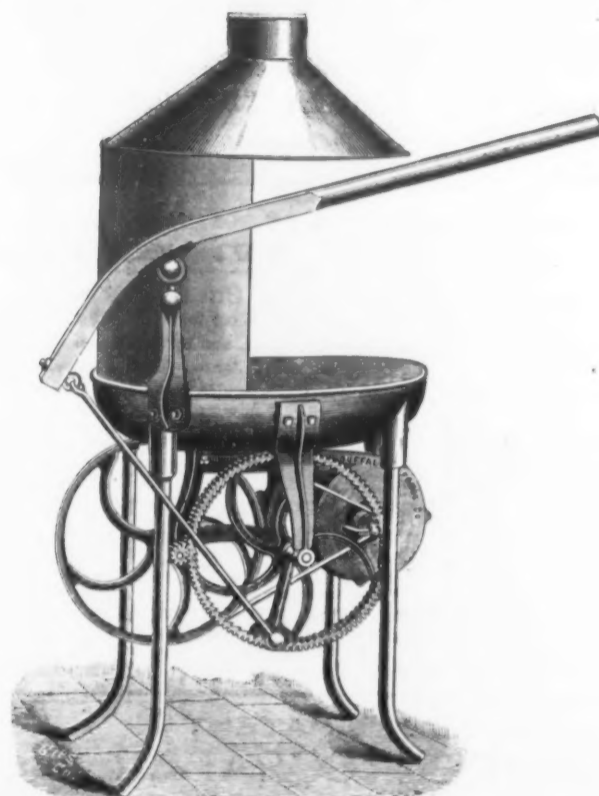
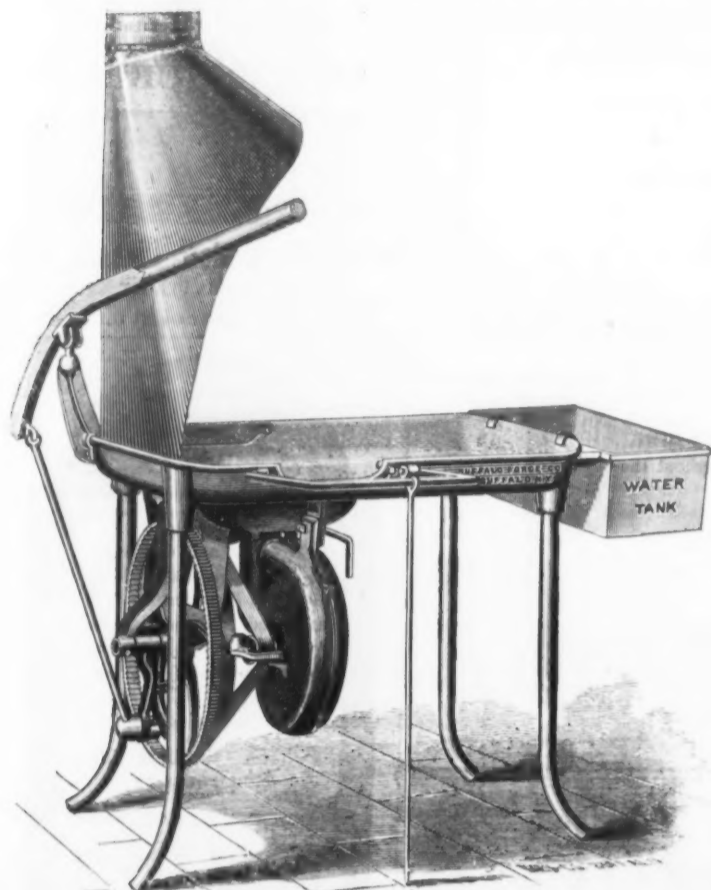


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Adjustable Jaw.
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ADAPTED TO ALL KINDS OF VISE WORK. ALSO
"PEERLESS" SWIVEL PIPE GRIP.
FITS ANY VISE. SOLD BY THE TRADE.
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SOLE PROPRIETORS. SEND FOR CIRCULAR.

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Manufacturers of the Only Perfect and Always Reliable

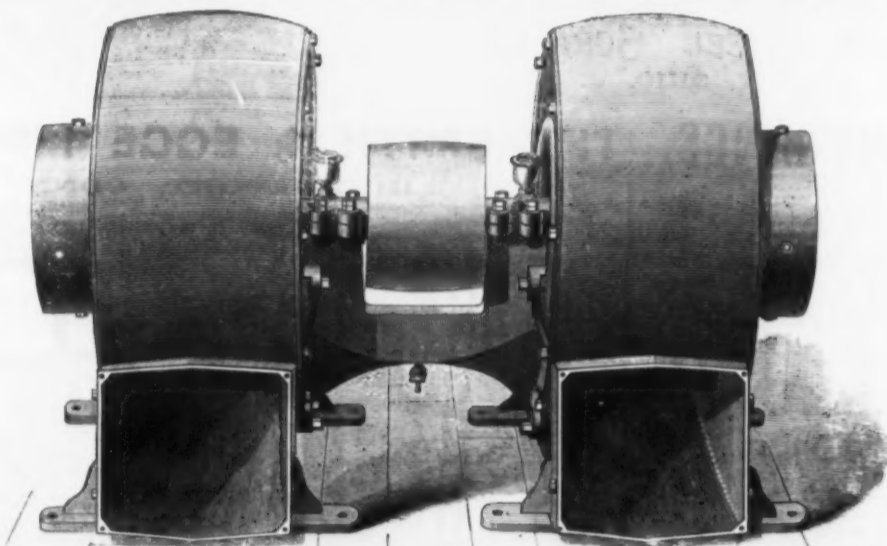
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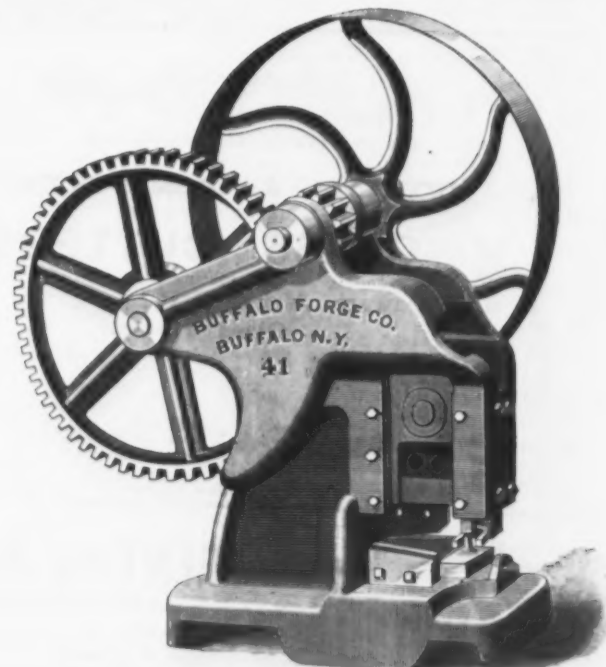
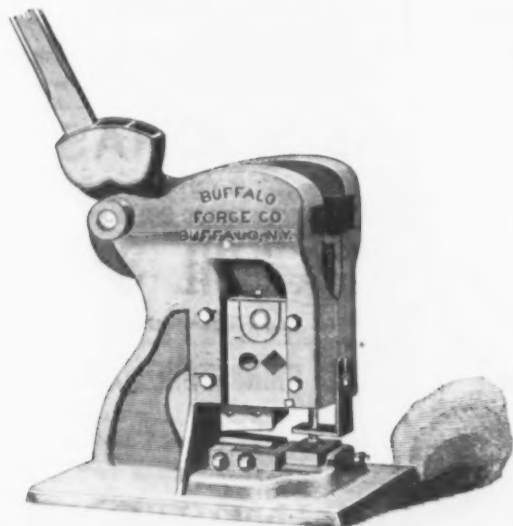
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KRAUT CUTTERS.

No. 1.....	1 knife, with box, 8 x 26, per dozen
" 2.....	2 knives, " " "
" 3.....	3 " " "
" 4.....	4 " " "
" 5.....	3 " " 9 x 30, "
" 6.....	2 " " 12 x 36, each.
" 7.....	3 " " " "
" 8.....	4 " " " "
" 9.....	3 " " 12 x 40, "
" 10.....	4 " " " "

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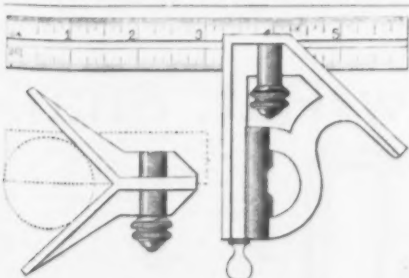
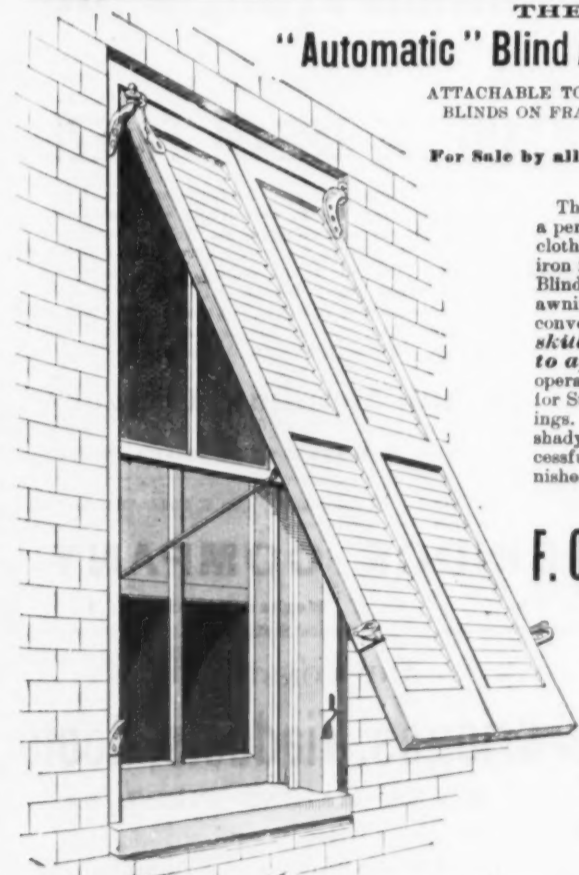
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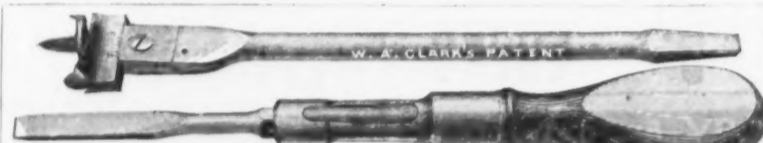
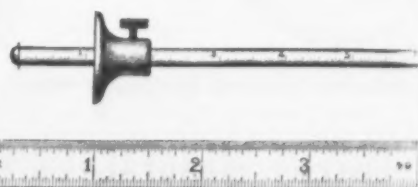
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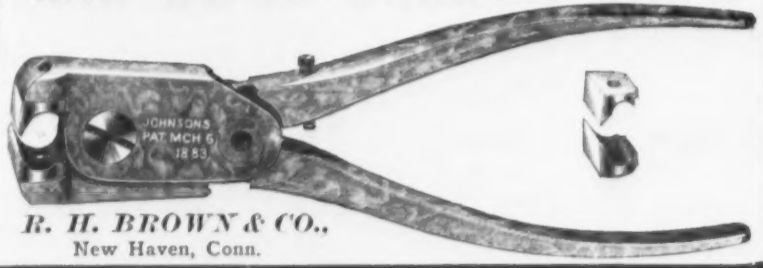
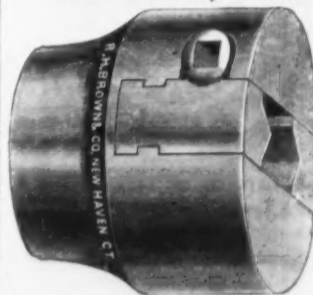
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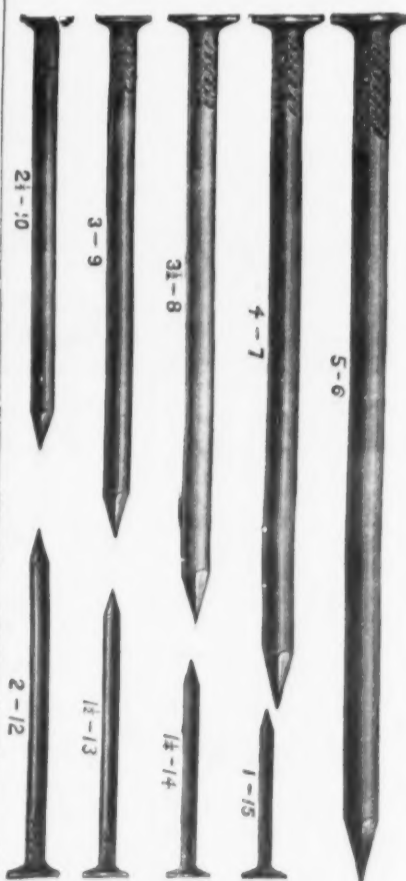
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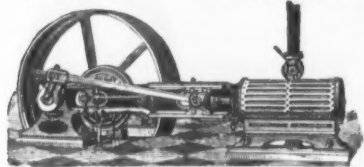
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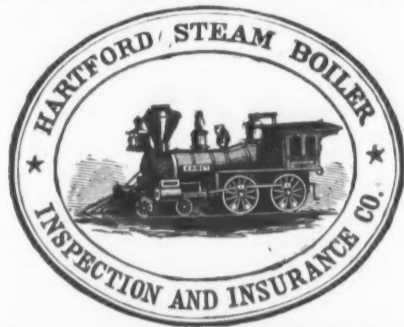


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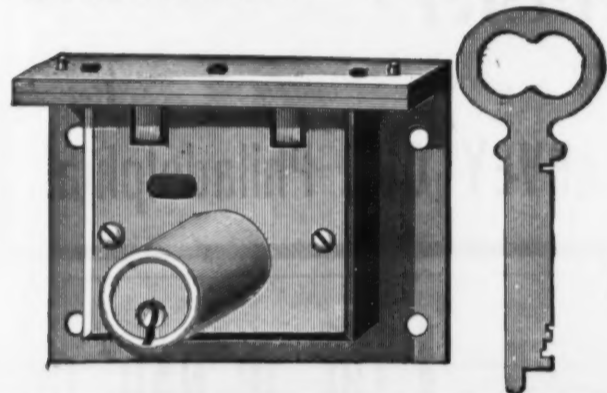
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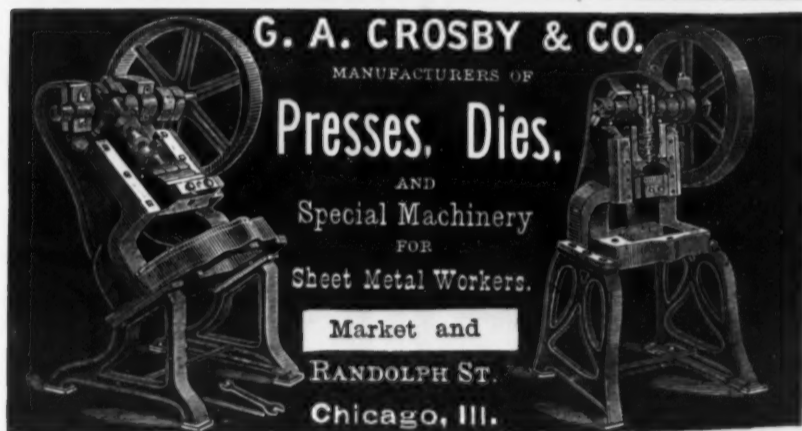
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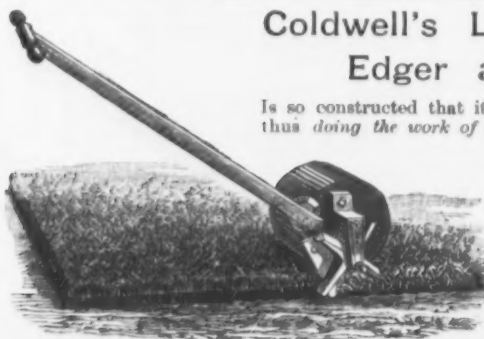
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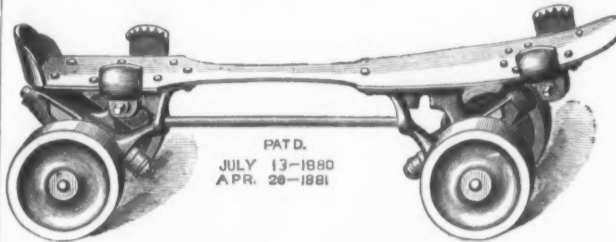
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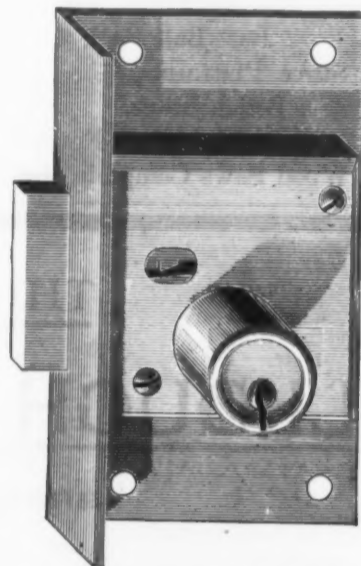
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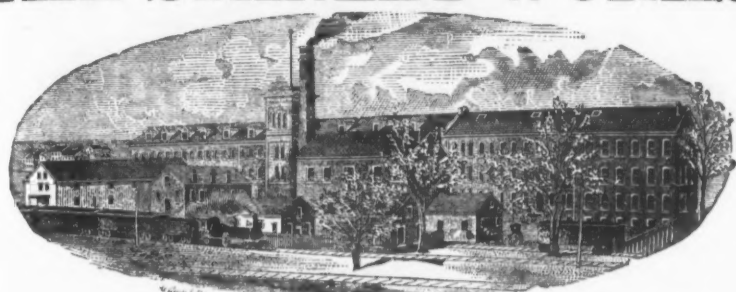
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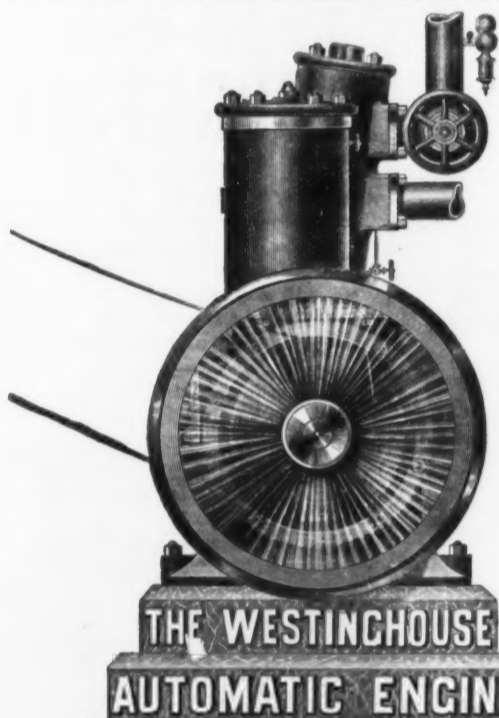
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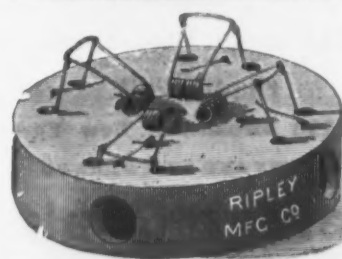
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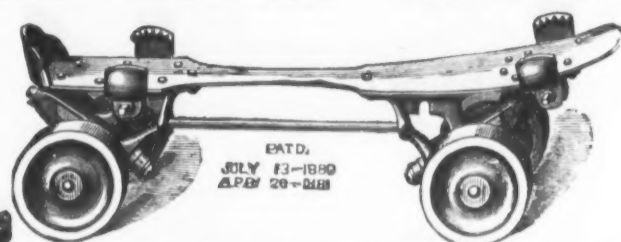
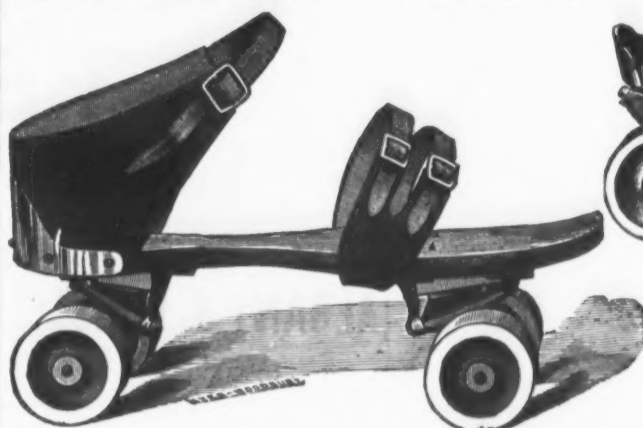
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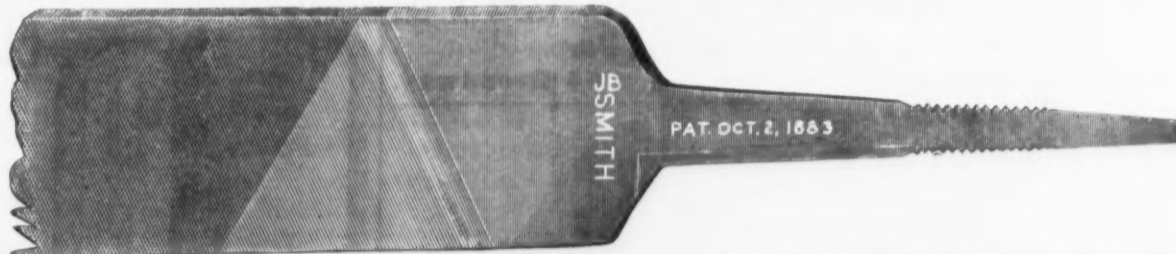
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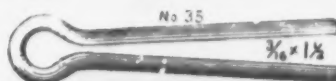
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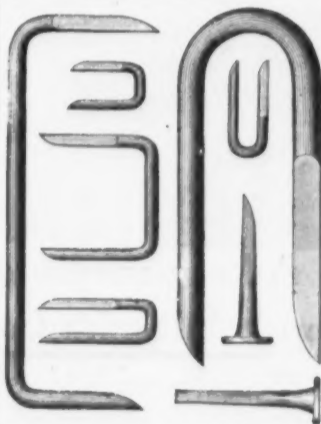
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Tacks, Small Nails,

DOUBLE-POINTED TACKS,

AND

STAPLES

From 1-4 to 3 1-4 in.

No. 1 Carries 7 feet earth.
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PATENTED

December 27th, 1881.

Runners Patented

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The York Pat.



Steel Scraper.

The Lightest and Strongest Scraper made. The body is made of one single piece of steel. The handles are fastened inside of fold, and free from all obstructions. The body, ball and runners are all made of steel. Especially suited for contractors. Send for circulars. Manufactured by

THE YORK MFG. CO., Limited, Portsmouth, Ohio.

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UNQUESTIONABLY THE

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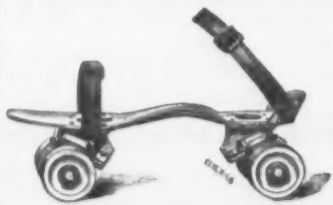
IN WOOD OR MALLEABLE BOTTOMS.

SEND FOR CIRCULAR.

CONNER & MATHER MFG. CO.

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Sample pair sent on receipt of \$2.50.



R. MUSHET'S
Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least double work by increased speed and feed, and cuts harder metals than any other steel. Neither hardening nor tempering required.

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Represented in the United States by
B. M. JONES & CO.,
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STEEL AND IRON RAILS,
Steel Tires and Axles, Tin and Terne Plates,

Swedish and Norway Iron,

Bessemer Steel and Iron

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Pig Iron, Spiegeleisen, Ferromanganese,

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Manufacturers of

STEEL COMPRESSED SHAFING

"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

SPRING STEEL,
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Exclusively for the

Analysis of Ores of Iron, Pig and Manufac-

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Slags and Coal for Practical

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This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.



Cut one-half size.

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PHILADELPHIA,

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Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.:

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HEIMER & AMEND,

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Eighteenth Street Station Elevated R. R.

Illustrated Catalogue mailed on Application.



NEW CHAMPION FORCE PUMP
HAS
Vacuum Chamber and Air Chamber,

Producing a continuous flow of water, both in suction and discharge. Works smoother and easier than any other force pump in the market. Has Seamless Drawn Brass Cylinders and no stuffing boxes. Never freezes in winter, and is not liable to get out of order. With Hose Attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c. It is specially adapted for all kinds of wells—dug, drilled or driven—and for pumping water long distances from springs.

CLARK'S IMPROVED
Ratchet Stocks, Dies & Pipe Vises
FOR USE BY
Plumbers, Gas Fitters and Pump Dealers.

With the Ratchet Stock pipe can be threaded in a corner, down in wells, or in positions that would be inaccessible with other tools.
Send for Circulars and Price Lists to

CLARK BROTHERS, Mfrs., Belmont, N. Y., U. S. A.

GUARANTEED
"GILBERTSON'S OLD METHOD"
Extra Coated Roofing Plates.

In view of the fact that we guarantee the "Gilbertson's Old Method" to be a heavier coated plate than either "M. F." or "Old Style," and, if not found so, boxes to be held subject to our order, the following letter, recently received by this firm (unsolicited on our part), is of value, as it comes from a roofer having many years' experience:

GUARANTEED

MONROEVILLE, O., Dec. 22, 1884
Messrs. MERCHANT & Co.,
Philadelphia, Pa.

Dear Sirs: After 25 years' experience running a tinshop, doing roofing work, &c., I am free to say that I have never seen any plate that equals the "Gilbertson's Old Method." Terms lately purchased of you. It is all you claim for it, and on my own buildings I shall use no other, and shall try and have my customers let me use it for them, as I consider it economy to do so.

Yours truly,
R. G. MARTIN.

MERCHANT & CO.,
525 ARCH ST., PHILADELPHIA. 90 BEEKMAN ST., NEW YORK.

MASSEY'S
E & K Patent Vises
NO LOST MOTION.
Have no equal for simple construction, convenience and durability.

T. C. MASSEY
Sole Manufacturer,
137 South Jefferson Street Chicago, Ill.

WRITE FOR DESCRIPTION.

Eastern Depot, LINK BELT MACHINERY CO., 81 John St., New York.

THE LONDON IRONMONGER.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 42 CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

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Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. *The Week, Legal News, Trade Notes, Bankruptcies, Foreign Notes, Colonial Jottings, Merchants' Circulars, &c.*, are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger* and *Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-subscribers at 75 cents.

By a mutual clubbing arrangement between the two journals, subscriptions to both will be received by either *The Ironmonger* or *The Iron Age* in the following terms:

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In the spring and autumn of each year there is published a special issue, the circulation of which is not less than **Twelve Thousand (12,000)** copies.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual presented free to every subscriber to the *IRONMONGER* AND *METAL TRADES' ADVERTISER*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer.

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows:

MAY 23, JUNE 20, JULY 18, AUGUST 15, SEPTEMBER 2, OCTOBER 31, NOVEMBER 28, DECEMBER 26, 1885, JANUARY 23, FEBRUARY 20, MARCH 20, and APRIL 17, 1886. This supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach, but in the native language of eighty millions of Germans, twenty-eight millions of Italians, and fifty-one millions of Spanish speaking people; or in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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so far as our experience of more than twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

Gooch Peerless and Giant Freezers



PEERLESS.

Now Sold by nearly
every Jobber in
the U. S.

NO OTHER
FREEZERS
EVER HAD SUCH A SALE.

They are as far ahead
of all competitors as can be imagined.

Send for Price List and Terms to the Trade.

MANUFACTURED BY THE

GOOCH FREEZER COMPANY,

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GIANT.

Hill Brothers & Co.,
Walsall, England,

Hardware, Saddlery and General

Merchants,

AGENTS FOR

BALL BROTHERS'

SHEEP SHEARS.

McCoy & Sanders,

SOLE AGENTS,

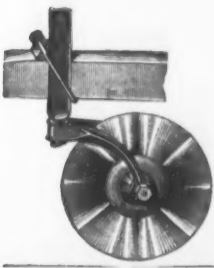
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NO DRAWING REQUIRED.
NO HAND WORK NECESSARY.
SEND (CHEAP, ARTISTIC,
FOR PARTICULARS) CROSSCUP & WEST ENG. CO.
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GEO. K. OYLER MFG. CO.,

ST. LOUIS, MO.,

MANUFACTURE ALL KINDS OF

**CASTER AND ADJUSTABLE
ROLLING COLTERS**

FOR WOOD OR STEEL BEAM PLOWS.

WRITE FOR PRICE LIST.

FRUIT WINE
AWARDED FIRST PREMIUM EVERYWHERE
20 DIFFERENT SIZES FROM \$2.50 TO \$100
& JELLY PRESS

MOLASSES
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SAUSAGE STUFFER

ENTERPRISE MFG. CO.
THIRD & DAUPHIN STS. PHILADELPHIA
Mrs. Potts' SELF WEIGHING CHEESE KNIFE.
THE BEST ARE THE CHEAPEST

COLD HANDLE SAD IRONS
SOLD BY ALL HARDWARE DEALERS
SEND FOR ILLUSTRATED CATALOGUE FREE.

SMOKED BEEF SHAVES
MEAT CHOPPER
BUNG HOLE BORER TOBACCO
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PEUGEOT FRÈRES,

MANUFACTURERS OF

Finest Grades of Steel

FOR WATCH, CLOCK AND OTHER SPRINGS.

Band Steel for Saws for Metal and Wood. Steel for all Mechanical Uses. The "Lion" Brand of Band Saws Best and Cheapest Made. Correspondence Solicited.

McCOY & SANDERS,

AGENTS FOR UNITED STATES AND CANADA

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LANE'S PATENT STEEL DOOR HANGER.

The most perfect Anti-Friction Hanger in the Market.



BECAUSE
It is made of steel throughout, except the wheel which has a steel axle. It will not break. It is practically free from wear. It is almost noiseless in action. It requires no oil. It has a broad bearing on the door, and keeps in line. It is by far the most durable. It may be used with any track. It is always in order.

LANE'S PATENT TRACK

Is made of steel and is easily put in position. Catches and holds no snow or ice. Door hung thereon cannot jump the track. Is not subject to decay. Requires no fitting, but is ready at once. May be used with hangers of other manufacture.

Manufactured by **LANE BROS.,** Poughkeepsie, N. Y.

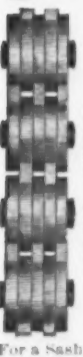
JOHN H. GRAHAM & CO. General Agents. 113 Chambers Street, NEW YORK.

"MORTON'S METAL."

(Registered Trade-Mark, May 1st, 1883.)



CHAMPION CHAIN.



Cable Chain.

CABLE AND CHAMPION SASH CHAINS

AND PATENTED ATTACHMENTS.

The most RELIABLE and CHEAPEST article in the market for suspending WINDOW SASHES. Has Great Tensile Strength, can be easily applied to any window, and gives SATISFACTION wherever used. Liberal Discount to the Trade. Now in use in all the leading cities throughout the United States. Have just furnished Chains to the following buildings: Mutual Life Insurance Co., Hoffman House, Williamsburg Fire Insurance Co., and the Navaro Flats.

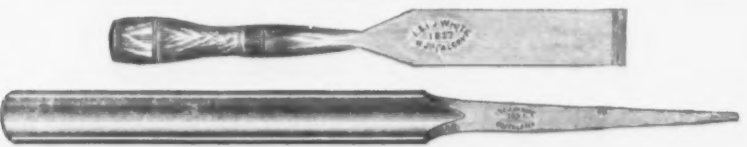
Samples Sent to any Hardware House Free on Application.

MANUFACTURED ONLY BY

THOMAS MORTON,

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FULL LINE CHISELS.

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FIRE BRICK.**

BEST AND CHEAPEST.

Established 1846.

Office, foot of Houston Street, East River,
NEW YORK.**NEWTON & CO.,**

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MANUFACTURERS OF BEST QUALITY

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DRAIN PIPE AND LAND TILE,

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FIRE BRICK

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Twenty-third Street,

Above Race, PHILADELPHIA.
Twenty years' practical Experience.

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Troy, N. Y.

James Ostrander & Son,

MANUFACTURERS OF

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Tiles, Blast Furnace Blocks, &c., and in a Special

Department Linings for Stoves, Ranges and Heaters of

superior quality. Miners of and dealers in Wood-

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Island Kaolin. See also page 60.

ESTABLISHED 1864.

JAMES GARDNER,

Successor to GARDNER BROS.,

MANUFACTURER OF

"STANDARD SAVAGE" FIRE BRICK,

TILE & FURNACE BLOCKS,

OF ALL SHAPES AND SIZES

Miner and Shipper of "Mount Savage" Fire Clay.

WORKS, Ellerslie, Allegheny Co., Md.

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N. M. Hamilton & Co., Agents, Baltimore, Md.

UNION MINING COMPANY.**Mount Savage Fire Brick.**

EDWARD J. ETTING, Agent,

222 South Third St., Philadelphia, Pa.

BIRMINGHAM FIRE BRICK WORKS.

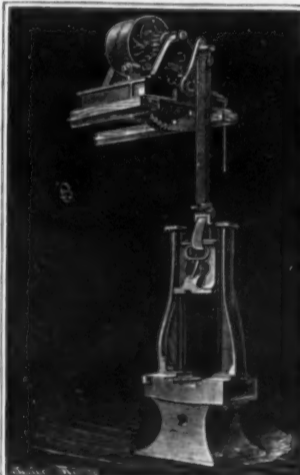
All dimensions constantly on hand. Fire Bricks, Fire Shapes, Kaolin, Fire Brick Cement, Fire Clay, Fire Sand for Furnaces, Coke Ovens, Stoves, Boilers, and for the Southern Trade generally.

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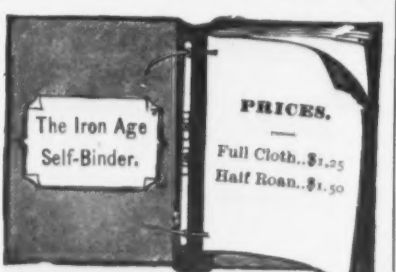


Drop Presses, Justice Hammers, Bending Machines, Punching and Shearing Presses.

Armstrong's New Safety Snap Hook.



To convince those interested of its superiority, sample will be sent by mail for cents in postage stamps. Dealers will please apply for prices and discounts to F. Armstrong, Manfr., Bridgeport, Conn.

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We are now prepared to supply our subscribers with an excellent self-binder for their papers, a cut of which is annexed. We call attention to the low prices at which it is offered. Address all orders to

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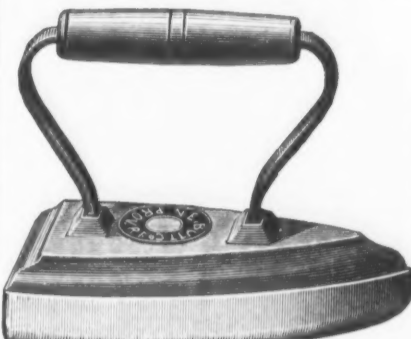
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NEW ENGLAND BUTT COMPANY,

MANUFACTURERS OF

Drilled Cast Butt Hinges,

AND

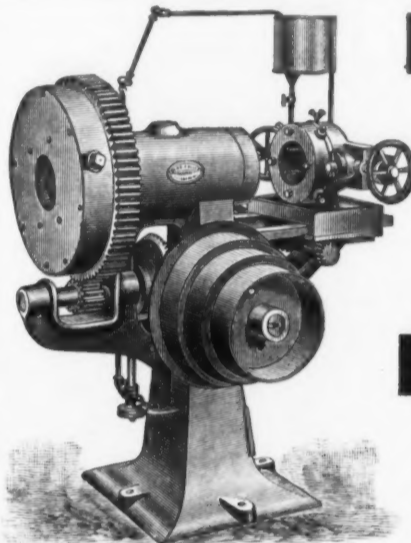
"CHINESE" LAUNDRY IRONS, SAD IRONS, &c.**"Chinese" Laundry Irons.**

These "Chinese" Laundry Irons are of superior quality, made from the best pig iron, highly finished, and rounded on edges, having Wrought-Iron Handles with neatly molded Tops of Cast Iron.

The Three Sizes, Nos. 1, 2 and 3, correspond in weight with 4, 5 and 7 lb. Sad Irons.

NEW YORK OFFICE:
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Factories: PROVIDENCE, R. I.

**Don't You?**

Have sufficient Pipe-Work about your Mill, Factory or Shops to make a Powerful, Convenient, and very Compact

Pipe-Cutting Machine

Soon pay for itself?

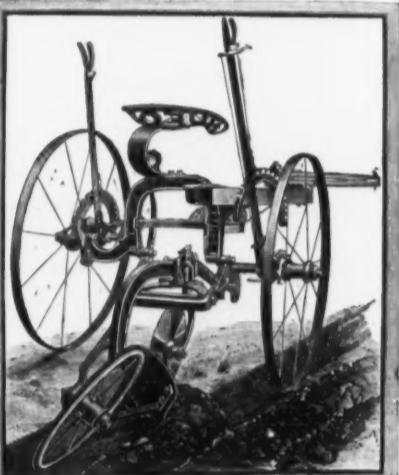
Don't You?

Further think it might pay you to write us for particulars of the "ECLIPSE" MACHINES, for which we claim many desirable features, including Moderate

Prices. We build the "Eclipse" for both Hand and Power use. Mention this Paper and address,

PANCOAST & MAULE,

PHILADELPHIA, PA.



THE BUFORD OBLIQUE WHEEL

LANDSIDE SULKY PLOW

WITH POWER LIFT.

The only Sulky Plow built on correct principles. All side and bottom friction of the plow is relieved, and in consequence the Buford Sulky draws one-horse lighter than any other sulky or hand plow made and doing the same work.

Send for circulars and prices to

ROCK ISLAND PLOW CO.,

SUCCESSORS TO

B. D. BUFORD & CO.,

Rock Island, Ill.

IRON ROOFING
SIDING, CEILING, ARCHES AND LATH.
CINCINNATI
CORRUGATING CO.
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SEND FOR ILLUSTRATED CATALOGUE

CORRUGATED CRIMPED

J. M. SCHOONMAKER,

MANUFACTURER AND SHIPPER OF

CONNELLSVILLE

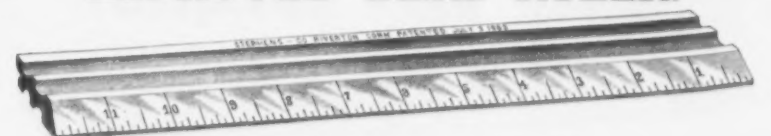
Capacity of Mines, 2500 Tons Daily.

Siding connections with all lines of Railroads.

Office, 120 Water Street, PITTSBURGH, PA.

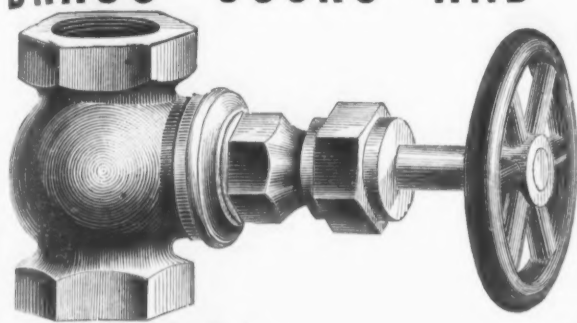
NEW YORK STORE, 204 Broadway.

After May 1st, 20 Chambers Street.

IMPROVED DESK RULER.

STEPHENS & CO., Riverton, Conn., Manufacturers of
U. S. Standard Boxwood & Ivory Rules.
Also, Exclusive Manufacturers of L. C. STEPHENS' PATENT COMBINATION RULE.
Send for Price List. Established in 1834.

McNab & Harlin Mfg. Co., MANUFACTURERS OF BRASS COCKS AND VALVES,



For STEAM,
WATER,
and GAS
Wrought Iron
Pipe
and Fittings,
PLUMBERS'
MATERIALS.

Factory, Paterson, N. J. 56 John Street, N. Y.
Our new Illustrated Catalogue and Price List is now ready, and will be sent to the trade with their first order, or by express, if desired, before ordering.



WM. H. HASKELL, President. E. S. MASON, Treasurer. D. A. HUNT, Agent.

WM. H. HASKELL CO., MANUFACTURERS OF

GIMLET POINT

COACH SCREWS



Bolts, Cold-Punched Nuts & Washers,
SUITABLE FOR MACHINERY OF ALL KINDS.

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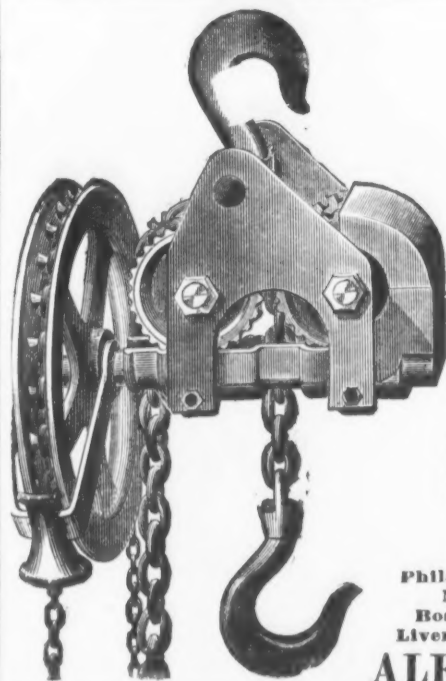
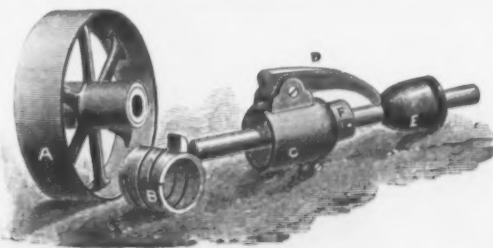
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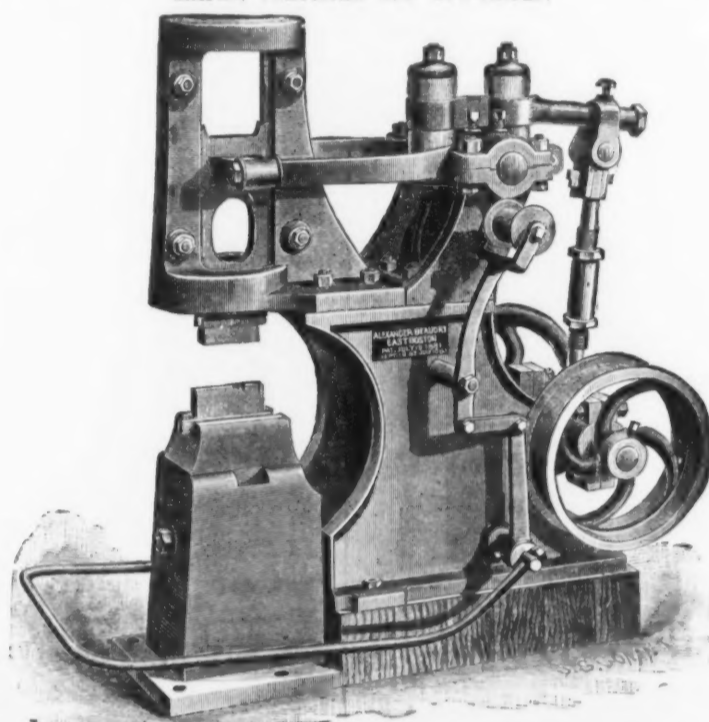
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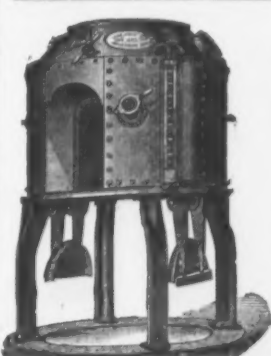
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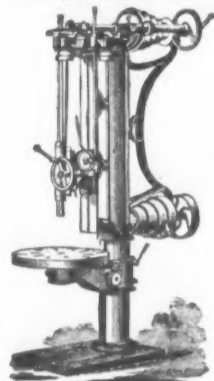
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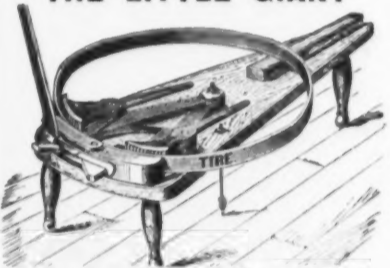
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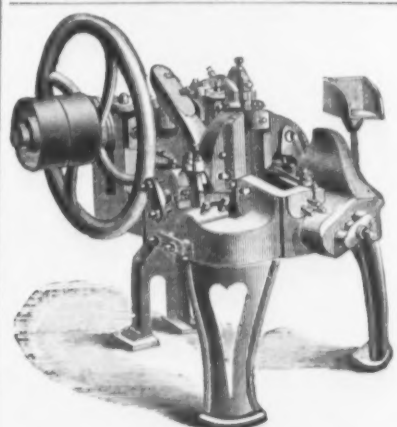
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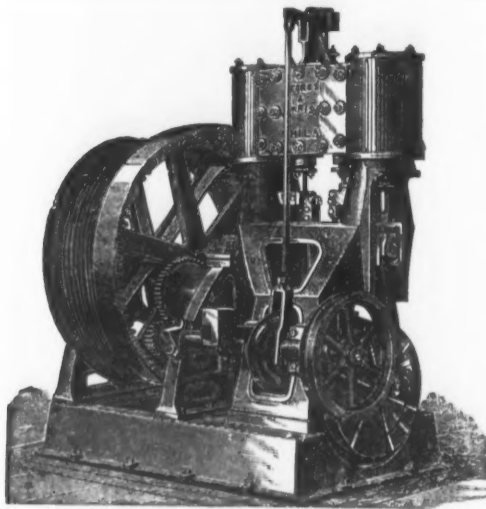
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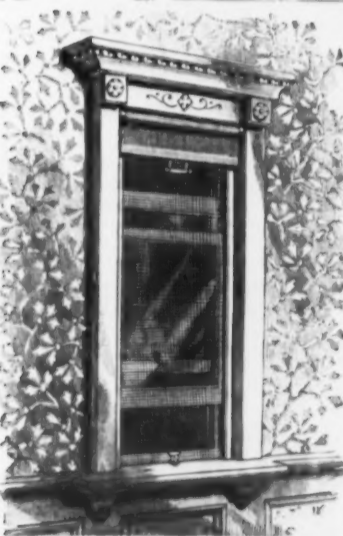
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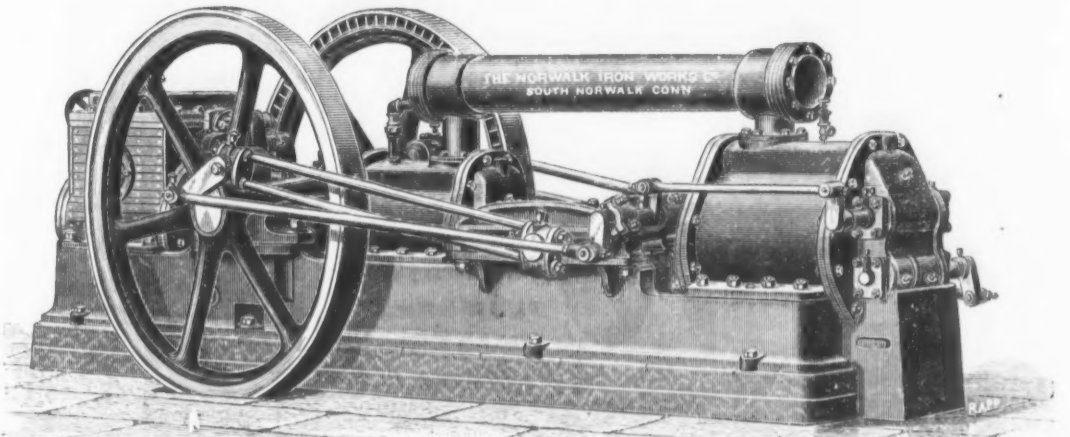
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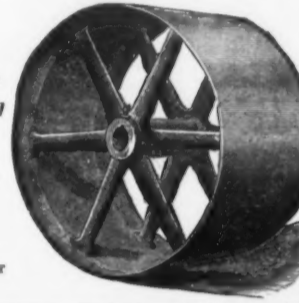
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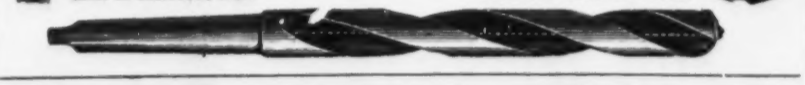
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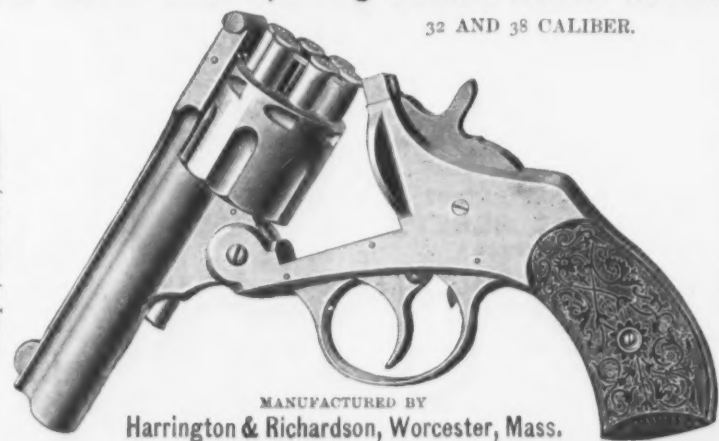


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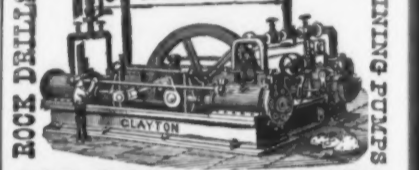


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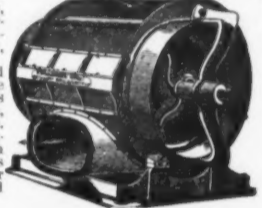
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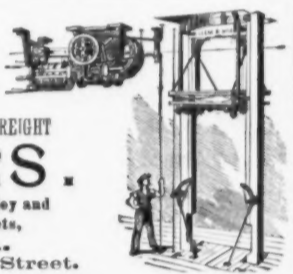
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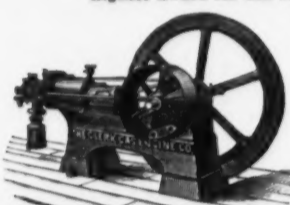
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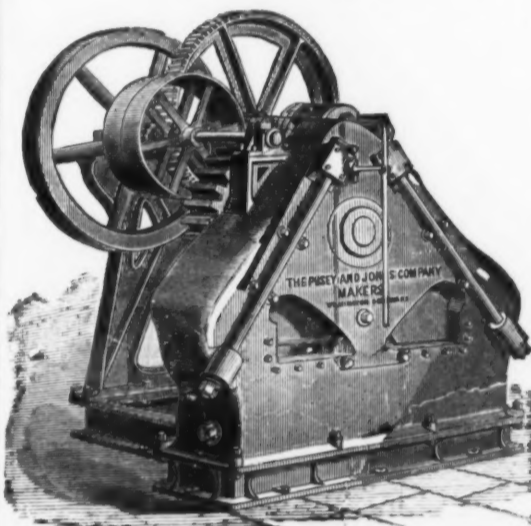
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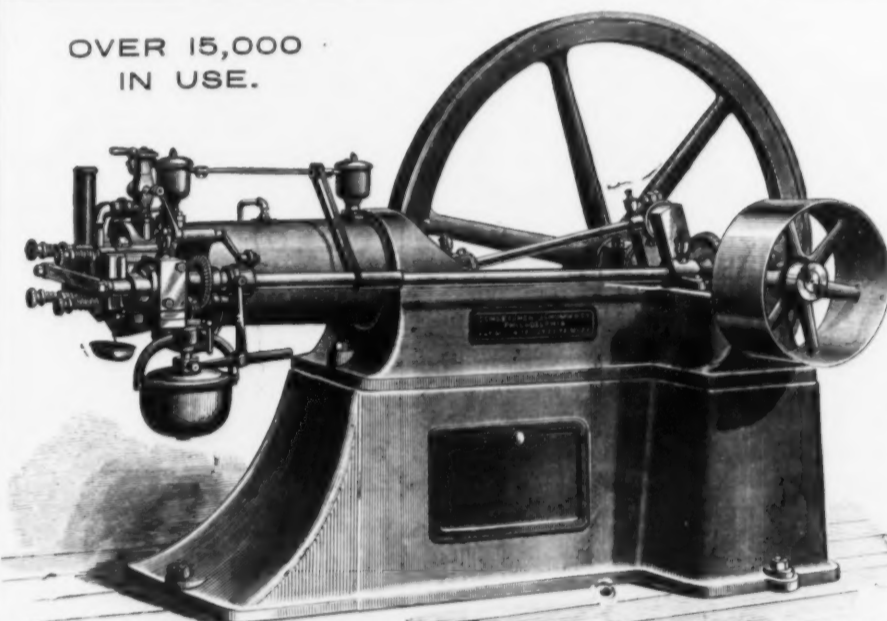
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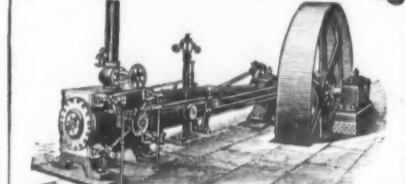
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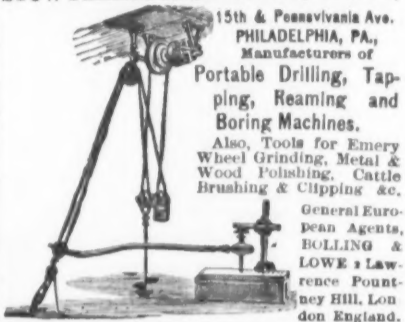
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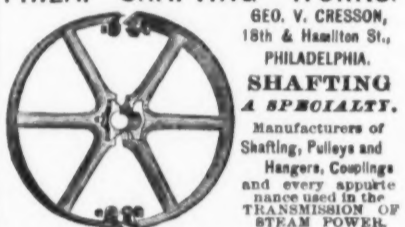
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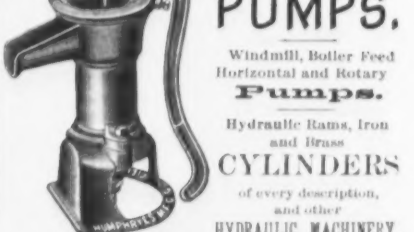
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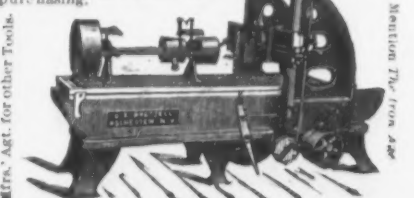
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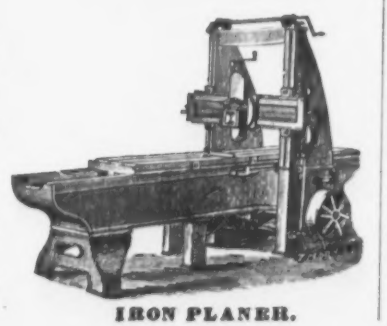
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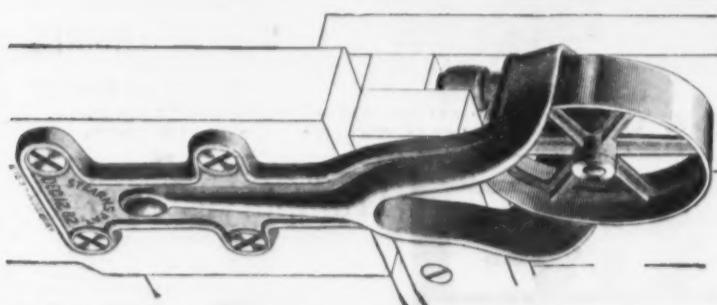
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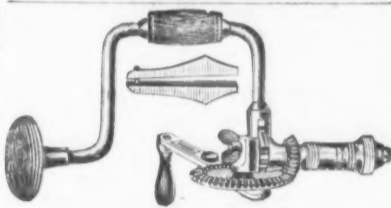
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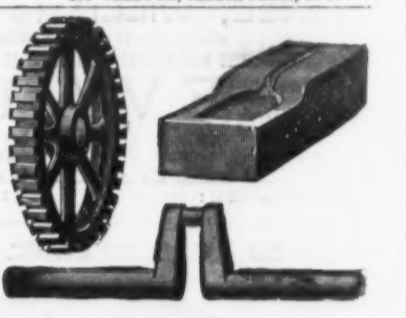
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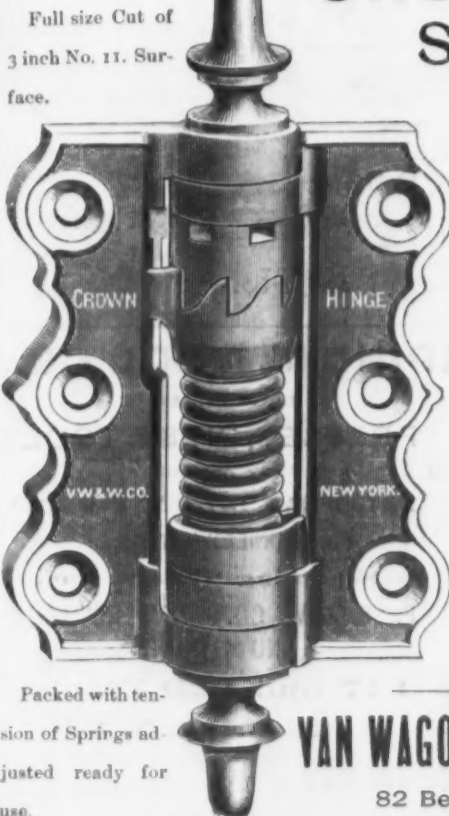
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